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Final Report of the California Spotted Owl Federal Advisory Committee

USDA United States Department of Agriculture
December, 1997

Acronyms

ALSEs	Areas of Late-Successional Emphasis
ASQ	Allowable Sale Quantity
BE/BA	Biological Evaluation and Assessment
CASPO	California Spotted Owl Technical Assessment Team
CFR	Code of Federal Regulations
CWHR	California Wildlife Habitat Relationships
d.b.h.	Diameter of tree at breast height
EIS	Environmental Impact Statement
FACA	Federal Advisory Committee Act
FVS	Forest Vegetation Simulator (model)
GIS	Geographic Information Systems
LP	Linear Programming
LRMP	Land and Resource Management Plan
LSOG	Late-Successional Old Growth (forests)
NFMA	National Forest Management Act
NEPA	National Environmental Policy Act
PAC	Protected Activity Center
PSQ	Potential Sale Quantity
QLG	Quincy Library Group
RDEIS	Revised Draft Environmental Impact Statement
RMZ	Riparian Management Zone
ROD	Record of Decision
SNEP	Sierra Nevada Ecosystem Project
SOHA	Spotted Owl Habitat Area
SRI	Stand Resiliency Index
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USGS	United States Geological Survey

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Final Report
of the
California Spotted Owl
Federal Advisory Committee

(Evaluation of the "Revised Draft Environmental Impact Statement (RDEIS) Managing California Spotted Owl Habitat in the Sierra Nevada National Forests of California")

December 1, 1997

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ABSTRACT

Findings: OWL Context
Spotted Owl protection is inadequate.
Furbearers have a high probability of extirpation under the preferred alternative.
Fire hazard reduction is lacking.
PSQ is overstated.
Roads increase and impact analysis may be flawed.
Evaluation of projections is difficult due to few Standards & Guidelines.
Assumptions and methodologies have inadequate documentation.

Recommendations: OWL Context
Readdress owl viability.
Readdress furbearer viability.
Add more fire hazard analysis.
Recalculate the projected PSQ.
Include adaptive management process.
Re-examine road density analysis and road databases.
Add descriptions of assumptions and methodologies.

Findings: ECOSYSTEM Context
Species viability assessment is inadequate in methodology and numbers of species addressed.
Spatial aspects among all major variables are not included.
Late-successional forests are not addressed as a unique resource or ecosystem.
Collaboration is inadequate, especially with science community.
Adaptive management methods are not defined.
Fire is not addressed as an ecosystem process.

Recommendations: ECOSYSTEM Context
Implement a collaborative process.
Ensure independent scientific review.
Use appropriate spatially explicit information.
Expand species viability assessments.
Develop a comprehensive aquatic/riparian strategy.
Include credible LSOG analyses and alternatives.
Include additional standards and guidelines, performance measures and principles for site-specific planning.
Provide for multiagency oversight.
Incorporate a comprehensive adaptive management process.
Include all lands in the analyses.
Include fire as an ecosystem process.

CALIFORNIA SPOTTED OWL FEDERAL ADVISORY COMMITTEE
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December 10, 1997

To all Interested Parties:

Enclosed you will find the Final California Spotted Owl Federal Advisory Committee Report. This is the final product of the Committee, which having accomplished its mission will disband. Please contact the Regional Forester in Region 5 for any further information about the outcome of this report. I will continue to be available for critical technical questions about the content of the report. We hope the Committee contribution will be useful to the US Department of Agriculture and the Forest Service in deciding how to proceed. Thank you for your interest, participation, and assistance.

Charles Philpot

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Executive Summary

Executive Summary

The Secretary of Agriculture established the California Spotted Owl Federal Advisory Committee. The purpose of the Committee was to conduct an evaluation of the proposed "Revised Draft Environmental Impact Statement (RDEIS) for Managing Spotted Owl Habitat in the Sierra Nevada National Forests of California." The charter called for the Committee to focus on assuring that the proposed RDEIS represents complete integration and analysis of all available significant information relevant to the management of National Forest System lands as part of the Sierra Nevada ecosystem. This evaluation was to occur prior to the release of the document for final public review. Based on this evaluation, the Committee concludes the RDEIS is inadequate in its current form as either an owl or ecosystem management EIS.

Notwithstanding this conclusion, the Forest Service EIS Team is to be commended for their efforts in dealing with this highly controversial issue and very difficult task given the constantly changing nature of the "target" or objective of the EIS. The EIS Team was cooperative and open in their dealings with the Advisory Committee. In fact, the Committee received excellent cooperation and support from the Forest Service. The Committee would also like to commend its own support staff for their outstanding job.

Through the gathering of formal and informal comment, public meetings and committee expertise, a large number of potential issues were identified (see Appendix B or inside back cover). Only those determined to be relevant to the Committee charter were retained and examined further. A process involving sub-committees, subject matter experts, and Committee deliberations was used to describe the issues and develop recommendations.

Initially, the Committee had a difficult time determining what the intent of the RDEIS was; owl management, ecosystem management, or both. Under what the Committee identifies as the "Owl Context," several critical shortcomings are described that the Committee feels need to be addressed prior to preparing a final EIS. These include: inadequate protection for the spotted owl, the use of inappropriate viability assessments, low viability of furbearers projected for the preferred alternative, lack of fire hazard reduction strategy, overstatement of potential harvest, several questions about the quality of databases, and lack of effective involvement of the science community. The Committee made no determination and presents no recommendations on the process to be used to revise the document. The Committee hopes the Forest Service seeks legal counsel related to species viability issues and the continuation of the EIS process.

Under the broader and more comprehensive scope of the "Ecosystem Context," additional problems are identified; some of which are expansions of those identified under "Owl Context." Of major concern to the Committee are the lack of any treatment of the uniqueness of the old-growth or late-successional forest ecosystems and their constituent species, and the failure to integrate fire into management strategies. Another concern is the exclusion of species expected to be addressed in an ecosystem management strategy. Perhaps most important, the RDEIS was not developed with formal collaboration with the scientific community, adjacent landowners and managers, and other federal agencies.

This report was reviewed by several technical experts for adequacy of analytical process, definition of issues, and consistency. It was not reviewed, nor should it have been, as a scientific document. Although the process generally required by FACA can be very frustrating, especially for an assignment like this, the Committee feels it achieved its objectives (the Committee focused on the adequacy of the RDEIS incorporation of current science). Members appreciate being considered and selected for this assignment. The Chair and Vice-Chair appreciate the effort and responsiveness from the very busy members. We hope the Committee contribution will be useful to the US Department of Agriculture and the Forest Service in deciding how to proceed.

Summary of Recommendations

The Committee makes the following recommendations if the RDEIS is primarily designed to address the continued viability of the California Spotted Owl. The Forest Service should:

- *Address several significant issues related to owl biology and ecology utilizing direct participation of "owl experts" including formal viability assessment techniques.*
- *Provide objectively defined evaluations of species viability and critically examine the viability evaluations of furbearers.*
- *Improve the documentation of assumptions, modeling methodologies, alternative selection process, and analyses.*
- *Perform additional fire hazard analyses and develop one alternative designed to reduce the probability of large, intense fires.*
- *Recalculate the potential sale quantity projected under the RDEIS preferred alternative based upon the probable allocation resulting from implementation of the aquatic/riparian management component.*
- *Add additional standards and guidelines or performance measures, and a description of how the monitoring results will be incorporated into an adaptive management process.*
- *Examine the road databases utilized and ensure road density impacts are appropriately analyzed and described.*

If an ecosystem strategy for the Sierra Nevada national forests is desired, the Committee recommends that the Forest Service establish a collaborative planning process in preparation for the upcoming revision of Forest Plans. The Committee does not feel the current RDEIS can be modified to produce such a strategy. Furthermore, the Committee does not feel a "crash exercise" is required. The Sierra Nevada Ecosystem Project report (SNEP) and RDEIS provide a significant basis upon which to proceed. Collaboration with State and Federal agencies and the science community is essential for producing a credible and supportable ecosystem management document.

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Chapter 1

Report Overview

Chapter 1
Report Overview

Introduction

Under the provisions of the Federal Advisory Committee Act of 1972 (FACA), in May of 1997, the Secretary of Agriculture chartered a Federal advisory committee to analyze the completeness of California spotted owl management proposals (see Appendix A for members). These proposals had been published in the "USDA Forest Service Revised Draft Environmental Impact Statement (RDEIS) for Managing the California Spotted Owl Habitat in the Sierra Nevada National Forests of California." The charter called for the Committee to focus on assuring that "...the proposed RDEIS represents complete integration and analysis of all available significant information relevant to the management of National Forest System lands as part of the Sierra Nevada ecosystem..." (see Appendix A). The analysis would require public input; an assessment of issues from Committee members, individuals, and institutions regarding the adequacy of the RDEIS; scrutiny of issue-related areas in the document for technical soundness; and recommendations. This report documents that analysis.

How this Report is Organized

Chapter 1 Report Overview—This chapter introduces the analysis with a brief history of the California Owl RDEIS, and provides an overview of the report development process.

Chapter 2 Issues and Recommendations Summary—This chapter first creates a framework for the issue discussion by explaining the context for review and recommendations. Two separate issue contexts emerged during the second meeting: 1) managing spotted owl habitat specifically, and 2) a conservation or ecosystem management strategy. This is followed by a summary of the issues, conclusions, and recommendations under the two different contexts; the last section describes the relationship between the Sierra Nevada Ecosystem Project (SNEP) report and the RDEIS.

Chapter 3 Detailed Issue Discussions—This chapter presents more detailed discussion under each major issue category.

Chapter 4 General Issues and Concerns—This chapter discusses issues and concerns that did not fit under the major issue categories. The chapter concludes with identification of information needs for the Sierra Nevada.

Appendix A contains the Federal Advisory Committee charter, and the listing of Committee members. **Appendix B** contains the report development process. **Appendix C** describes the report peer review process.

History of the RDEIS

Terms to know:

SOHA Strategy and SOHA Based Habitat: a defined management area containing 1,000 acres of base habitat (which consists of a nesting core of 300 contiguous acres and an additional 700 acres that must include at least one 300-acre alternative nesting core) and 650-1,650 acres of replacement habitat outside of the base habitat area. Where possible, these areas contain large blocks of contiguous late-successional habitat or potential habitat.

Forest Plans: The 10 national forests in the Sierra Nevada completed their plans in accordance with the National Forest Management Act of 1976 (NFMA) during the period 1988-1993. The plans are to be amended as needed and revised every 15 years.

Matrix: The most extensive and connected landscape element type present, which plays the dominant role in landscape functioning. Also, the landscape element surrounding a patch of forest.

Mid-to Late-Successional Habitat: Forest habitat which provides the structural, compositional, and climatic conditions characteristic of established mature-to-old forest such as: large (relative to site productivity) and decadent trees, snags, and down logs and high levels of vertical (canopy) and horizontal heterogeneity.

d.b.h.: Tree diameter at breast height (4.5 feet above the ground).

Basal area: area of the cross-section of a tree stem generally at d.b.h.

PAC: Protected Activity Centers

The Forest Plans in the Sierra Nevada originally relied on a network of spotted owl habitat areas (the SOHA strategy) to provide the habitat needed for spotted owl viability. New research findings and the listing of the northern spotted owl as threatened under the Endangered Species Act invalidated the SOHA strategy for the northern spotted owl, and by extension for the California spotted owl as well. The northern spotted owl issue led to a series of lawsuits and injunctions before and after its listing. Both the Forest Service and the State of California Resources Agency wished to avoid a repeat of this situation with the California spotted owl. Therefore, a Technical Assessment Team and a Policy Implementation Planning team appointed by the agencies in 1991 produced two reports. One described what was known about the owl, its habitat, and an interim strategy for maintaining the owl throughout its range; the other presented alternative institutional approaches for implementing Technical Team recommendations while minimizing economic, environmental, and social costs (referenced in the RDEIS).

Interim Guidelines from the technical assessment were then added by amendment through an Environmental Assessment to the 10 Forest Plans in the Sierra Nevada. They were to be used for two years until the California Spotted Owl EIS was prepared. The use of an environmental assessment to put interim direction in place while preparing an EIS allows quick changes to Forest Plans during time-consuming NFMA and NEPA procedures.

An interdisciplinary EIS team was assembled in the spring of 1993. Following the processes outlined by the National Environmental Policy Act (NEPA), this team developed a DEIS and published it for public review. Based upon public review, a revised draft EIS (RDEIS) was developed with seven alternatives responding to the following issues:

- *Issue 1*--Will proposed standards and guidelines, which consider the best available scientific information, be adequate to maintain habitat for viable populations of the California spotted owl?

- ***Issue 2***--Will habitat management affect timber supplies and related local, regional, and national economies?

- ***Issue 3***--How will proposed habitat management affect the potential for high-severity fires that endanger California spotted owl habitat, other forest resources, communities, and life and property?

- ***Issue 4***--To what extent will the California spotted owl habitat management contribute to the viability of other wildlife species in the Sierran ecosystem?

- ***Issue 5***--How will proposed habitat management affect released roadless areas, contiguous blocks of late-successional forest, and riparian areas?

- ***Issue 6***--How will proposed habitat management affect forest health, including the potential for disease and insect epidemics?

The seven alternatives developed are as follows:

Alternative A--Alternative A, which is described in the RDEIS as the No-Action Alternative, would continue current management policies and practices specified in Forest Plans as they existed before adoption of the Interim Guidelines. To facilitate consistency in modeling and analysis, the land bases were updated and standardized to reflect current operating policy.

Alternative B--Alternative B was designed to maintain an uneven-aged forest with a general appearance of continuous forest cover. Small groups of trees, generally 2 acres or less, could be harvested, and the matrix lands between these groups would be available for thinning.

Alternative C (Preferred in DEIS)--In Alternative C, vegetation would be managed based on three general zones of desired forest structure at the landscape level. The zones would be designed to reflect some aspects of what are thought to resemble pre-Euro-American landscape conditions.

Alternative D (Preferred in RDEIS)--Under alternative D, desired conditions are defined for each of five major forest types: eastside pine, ponderosa pine, mixed conifer-pine (including mixed conifer-Douglas-fir), mixed conifer-fir, and red fir. This alternative would emphasize development of mid- to-late-successional habitat in the mixed conifer-pine, mixed conifer-fir, and red fir types and would emphasize development of open, large-tree dominated forest in the eastside pine and ponderosa pine types.

Alternative E--Alternative E would establish a reserve network where no commercial harvesting would occur. The reserve network would contain the following:

- Large contiguous blocks of late-successional forest vegetation, including some of the currently undeveloped released roadless areas.

- All other stands with greater than 24-foot average crown diameter and greater than 40 percent tree cover.

- Riparian corridors that would be managed according to the Aquatic/Riparian Conservation strategy.

- Protected activity center (PAC) and SOHA base habitat areas.

Alternative F--This alternative is a combination of Alternative B (modified) and a management proposal developed by the Quincy Library Group (QLG) and modified by the Forest Service. The QLG proposal covers the Lassen and Plumas National Forests and the Sierraville Ranger District of the Tahoe National Forest. Key objectives of the QLG proposal include community economic stability through timber production combined with protection of reserved lands and riparian areas, increased emphasis on watershed restoration, and an extensive fuels reduction program.

Alternative G--Alternative G implements the recommendations for interim management from the Technical Report (CASPO) as a longer-term strategy. These recommendations are currently in effect on the ten affected forests. In owl nesting and roosting habitat, all trees 30 inches d.b.h. or larger, 40 percent of the existing basal area of the largest trees, and 40 percent canopy closure would be retained (all three conditions must be met). In foraging habitat, all trees 30 inches d.b.h. or larger, 30 percent of the existing basal area of the largest trees, and a minimum of 50 square feet of basal area would be retained (all three conditions must be met). Under this strategy, protected PAC and SOHA base habitat would have no scheduled timber harvest, and no stand-altering activities other than light underburning.

Committee Activities and Processes

The California Spotted Owl Federal Advisory Committee held three public meetings during its charter (see Appendix B for minutes). The first meeting was held on July 7-8, 1997, in Sacramento California. The meeting focused on overview presentations of the RDEIS and the Sierra Nevada Ecosystem Project (SNEP). The Committee discussed and decided on operational processes, formed several subcommittees (see Appendix B), and reviewed agreements and agenda items for the August Committee meeting. The Committee spent considerable time discussing the meaning of the word "integration" in the charter. In conclusion, it was defined along the lines of incorporation or consideration.

At the second meeting (August 11-13, 1997, in Sacramento, California) each subcommittee leader reported on findings to date and presented a summary of tentative issues within their subject area. Invited groups discussed the Region 5 monitoring program development, US Senate Committee findings, owl and wildlife viability, aquatic/riparian issues, late-successional old growth (LSOG) issues, and modeling issues. Presentations were made by the California Forestry Association, representative SNEP participants, and interest group representatives. This meeting included one full day for public testimony. (Public testimony transcripts are a part of the process record.)

The third meeting (September 11-13, 1997, in Visalia, California) focused on completing the draft report and agreeing on a report review process. The Committee discussed and evaluated the issues (using an issues matrix chart—see Appendix B), and selected those for further evaluation and inclusion in the draft review report (see issues identification discussion below). A framework was developed and sections were written during the meeting to create the first draft report. Committee

alternatives, standards and guidelines, viability assessment, fuels and fire, LSOG, alternative evaluations, spaciality, the monitoring plan, roads, and science support. The Committee also approved the review process and identified potential reviewers (see Appendix C).

Contacts

The Committee made contact with many diverse organizations and individuals. Committee members made additional contacts to help assure key issues were identified for evaluation. The organizations most active with the Committee include:

US Forest Service Region 5 staff and line officers,
US Forest Service Pacific Southwest Research Station scientists and administrators,
Sierra Nevada Ecosystem Project (SNEP) scientists and leaders,
California Forestry Association,
California Forest EIS (Senate) Review Committee,
Several State resource agencies and commissions/boards,
Natural Resource Defense Council (NRDC),
Pacific Rivers Council,
Quincy Library Group,
Association of Rural Counties,
Wilderness Society, and the
Sierra Nevada Forest Protection Campaign.

Issues Identification

During the second meeting, through testimony, documents, review, and Committee member contributions an extensive list of 69 potential issues was identified (see Appendix B or inside back cover). This initial list was classified into subcommittee assignments and further evaluated. During the third meeting, the Committee used a process that eliminated issues outside the Committee charter (or those that were not valid) and combined similar issues (see Appendix B). Following Committee discussions, groups of issues were assigned to members for further evaluation and development of issue papers. After Committee review, these issue papers became Chapter 3 of the report. The Committee members reviewed two drafts prior to sending the report to formal reviewers as well as sharing it with interested parties. Issues not retained for the body of the report are documented in Appendix B within the issues matrix chart. Also see Appendix B for assignment of subcommittees, and for the proposed criteria for evaluating the alternatives.

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Chapter 2

Issues and Recommendations

Chapter 2
Issues and Recommendations

Introduction

This chapter provides a description of the two contexts that emerged during the second Committee meeting: OWL and ECOSYSTEM. This is followed by a description of the issues, conclusions, and recommendations. The last section describes the relationship between the Sierra Nevada Ecosystem Project Final Report (SNEP) to Congress and the RDEIS.

Context for Review and Recommendations

The Committee had a dilemma regarding the basis on which the RDEIS should be evaluated; i.e., as an analysis of alternatives for:

(1) management specifically addressing the California spotted owl or

(2) an ecosystem management strategy for the Sierra Nevada national forests.

The stated purpose of the RDEIS relates primarily to management and protection of California spotted owls: "The purpose of this analysis is to develop a longer-term management strategy to maintain the viability of California spotted owl populations on National Forest System lands. . ." (USDA Forest Service Pacific Southwest Region 1996). Some individuals and organizations providing testimony to the Committee have strongly agreed that the RDEIS should be narrowly focused on the owl.

On the other hand, the scope of the RDEIS was enlarged during its development to include protection and management of resources and ecological values as indicated by the RDEIS subtitle, "An Ecosystem Approach." The RDEIS summary states that "Issues related to riparian area management, habitat needs for the wildlife community as a whole, forest health, timber supply, and the role of fire..." were incorporated into the alternatives and analysis (USDA Forest Service Pacific Southwest Region 1996), clearly opening itself to a more comprehensive critical analysis.

Whereas some interested parties view the RDEIS within the owl context, others expect that the RDEIS is or should be a comprehensive ecosystem management strategy for the national forests in the Sierra Nevada. Certainly the Forest Service encouraged such an expectation as noted in the preceding paragraph. The charter provided the Committee by the Secretary of Agriculture also clearly identifies larger concerns than the owl as noted in purposes 1.a.(3) and 1.b which refer to "integration and analysis of all available significant information relevant to the management of National Forest System lands as part of the Sierra Nevada ecosystem" (USDA Departmental Regulation 1043-41).

The Committee members also wonder about the legality and appropriateness of a RDEIS focused solely on a species, such as the California spotted owl, based upon precedents in recent case law. The Committee does not have legal expertise and was not chartered to address legal questions. Nevertheless, case law developed over the past 10 years is indicative that a regional EIS narrowly defined to a single species is unlikely to survive judicial challenges; e.g., the precedent with the northern spotted owl analyses in the Pacific Northwest.

The Committee recognizes this dichotomy in views but feels that determinations as to the intent and breadth of the RDEIS are political, managerial, and, perhaps, judicial decisions. Consequently, we evaluate and provide recommendations regarding the RDEIS in two different contexts: (1) As a document focused exclusively on the California spotted owl—*context OWL*; and (2) as a document focused on integrated management of national forests in the Sierra Nevada—*context ECOSYSTEM.* Our report will refer to these two different contexts or cases in its recommendations and comments. In effect, because these two contexts differ so widely, we identify issues and recommendations specific to each context. Some issues are applicable to both contexts, although their breadth and significance may vary.

Context OWL

Within the context OWL, the Committee addresses the RDEIS exclusively as a proposal to assure the viability of the California spotted owl on the national forests of the Sierra Nevada. This context is consistent with purpose 1.a.(1) of the Committee's charter: "The purpose of the advisory Committee is to conduct an evaluation of the proposed Revised Draft Environmental Impact Statement (RDEIS) for Managing California Spotted Owl Habitat in the Sierra Nevada National Forests. . .".

The proposed action, as stated in the RDEIS is:

> *"The USDA Forest Service, Pacific Southwest Region (R5), intends to establish standards and guides for habitat management to maintain viable populations of the California spotted owl on National Forest System lands in the Sierra Province. The proposed action will amend the Pacific Southwest Regional Guide and existing Sierra Province National Forest LRMPs to incorporate changes in management direction."*

The purpose and need is stated as:

> *"The Forest Service must manage habitat for the California spotted owl on National Forests in the Sierran Province in accordance with the requirements of the National Forest Management Act (NFMA) and its implementing regulations. The regulations (36 CFR 219.19) require that wildlife habitat be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.*
>
> *The purpose of the proposed action is to amend the Pacific Southwest Regional Guide and existing Forest LRMPs within the Sierran Province to provide direction for an ecosystem approach to managing habitat to maintain viable populations of the California spotted owl. Alternatives considered in this document will be analyzed within the context of sustainable, biologically diverse forest ecosystems with the intent of meeting the following objectives:*

Provide key California spotted owl habitat elements by:

- *Protecting known owl nest stands from significant modification.*
- *Protecting very large, old trees in those timber strata that will provide suitable habitat.*
- *Reducing the likelihood of high-severity fires.*
- *Contributing to the viability of other widely distributed plant, wildlife, and fish species whose populations may be at risk (Federal or State-listed species, late-successional forest associates, neotropical migrants, or other species experiencing population declines).*
- *Contributing to the economic and social well-being of local communities and the Nation.*
- *Providing for sustainable levels of renewable natural resources consistent with multiple-use objectives."*

Based upon these statements the Committee will consider for context OWL that the RDEIS is essentially a set of alternatives addressing the viability of the owl with only peripheral consideration of related resources and ecosystem components. The Committee believes, for example, viability analysis of species in addition to owls, such as furbearers, should be included in this context.

Context ECOSYSTEM

Context ECOSYSTEM is an evaluation of the RDEIS on the basis that it is intended to be a conservation or ecosystem management strategy for the national forest lands of the Sierra Nevada; i.e., it is an analysis that considers all species, ecosystems components and processes, and resource values. This context is consistent with Forest Service and other Federal land management planning in other regions in the United States. Many individuals and organizations contributing testimony to the Committee view the RDEIS in this context and have emphasized that they desire this type of outcome. Indeed, some Forest Service employees refer to the RDEIS as a conservation strategy. In the Committee's view, a conservation or ecosystem management strategy for the national forest lands in the Sierra Nevada would incorporate at least the following actions:

- Develops direct involvement and independent review by the scientific community.
- Develops multiorganizational participation.
- Addresses all lands within the area of analysis, although management direction is usually provided only for public lands.
- Addresses relevant ecological processes at scales appropriate to each process.
- Incorporates a landscape basis and applies current ecological principles, including those from conservation biology.
- Addresses all resources and ecological values.
- Addresses viability of all constituent species.
- Addresses old-growth forests as a unique forest ecosystem.
- Incorporates a comprehensive aquatic/riparian strategy.
- Addresses alternative methods of reducing fire hazard when dealing with ecosystems that are subject to modified periodic fire regimes.

- Includes standards and guidelines or performance measures, and planning guides for the next level of planning and implementation.
- Identifies elements of an adaptive management strategy.
- Incorporates at least the conceptual elements of a monitoring plan.
- Provides processes to address site-specific issues and concerns.
- Considers both short and long term timeframes.

Context ECOSYSTEM is consistent with Committee charter Purposes 1.a.(3) and 1.b, i.e., "The focus of the Committee will be to assure that the proposed RDEIS represents complete integration and analysis of all available significant information relevant to the management of National Forest System lands as a part of the Sierra Nevada ecosystem."

Major Issues

The Committee has identified separate issues for each of the two contexts. Issues regarding the acceptability of the RDEIS analysis of alternatives for management of the California spotted owl or as an ecosystem management strategy are discussed in full detail in Chapter 3. These were identified through testimony provided by individuals and institutions and by the Committee's own analysis of the RDEIS. A summary of the most significant issues under the two contexts follows.

Issues Within the RDEIS Owl Context

Several critical aspects of spotted owl viability are inadequately addressed by the RDEIS. For example, the viability assessment is not replicable, documented, and based upon all available science. It is not an objective analysis of either the short-or long-term potential impacts of the alternatives on the distribution and abundance of owl habitat or on population viability. Critical questions remain about the future condition and distribution of habitat, road densities, population trends, and fire effects.

The Committee concludes that the furbearers, have a high probability of extirpation under the preferred alternative. It is unclear to the Committee how many species need to be included in the viability analyses under the OWL context; however, if the current array is adequate the processes used to assess species viability are not.

The RDEIS does not present any alternative that is designed to reduce fire hazard, in spite of the virtual consensus that high intensity fire is a major problem in the Sierra Nevada. Under the OWL context fire occurrence and severity are considered significant issues for the owl habitat strategy selected. These issues stem from unsupported assumptions, lack of standards and guidelines or performance measures, and concern for cost (see Fuels and Fire Hazard discussion in Chapter 3).

There is a considerable overstatement of Potential Sale Quantity (PSQ) in the RDEIS due to the methods used to evaluate the impacts of implementing the aquatic/riparian component. It is probably safe to say this amounts to 14-39%. A precise estimate is difficult to make because of the lack of specifics on how the aquatic/riparian component will actually look on the landscape. (For

more detail, see Modeling of Vegetation Development and Silvicultural Effects, Viability Assessment, and The Range of Alternatives and Their Evaluation in Chapter 3.)

Road mileage increases under all alternatives. The significance of this issue is unclear to the Committee primarily because total road mileage density and the cumulative effects of present roads, Forest Service and non-Forest Service, are not analyzed. It has been many years since EISs of this nature showed net increases in road density. This issue may be compounded by evidence the Committee obtained that shows road density impacts are understated in the RDEIS due to the databases utilized (for more detail see Road Issues in Chapter 3).

Most significantly, for this Committee *it is difficult to evaluate projections and impacts because of the lack of a quantitative description of the landscape over time.* The RDEIS is written primarily as a descriptive document, not a prescriptive document. It therefore makes limited use of traditional standards and guidelines. The specifics of tactical strategy are left up to the forest planning process. This is meant to maximize innovative approaches by allowing for site-specific solutions that otherwise might be constrained by rigid standards and guidelines. Some would contend that reliance on standards and guidelines encourages use of loopholes that result in unsatisfactory implementation; on the other hand, considerable mistrust of the Forest Service leads to demands for standards and guidelines. (For more detail, see Standards and Guidelines and the Monitoring Plan, and Spatial Issues in Chapter 3.)

Several issues are related to modeling assumptions, range of alternatives, method of selecting the preferred alternative, and the content of the monitoring plan. (See detailed issue discussions in Chapter 3.)

As a result of these and other issues the Committee concludes that the RDEIS does not meet even the narrow objectives of context OWL. One of the findings about the RDEIS is that, although potential loss of California spotted owl habitat to catastrophic fire was identified as a very important single issue, the selected alternative does not appear to affect catastrophic fire risk for at least the first several decades following its implementation. Also, the narrowness of the RDEIS focus is indicated by the fact that analysis of effects on many other vertebrates, including furbearers and amphibians, appears to be inadequate or absent. The EIS team did not adequately utilize the assemblage of California spotted owl experts available to them, and in fact, chose not to respond to their concerns about the preferred alternative.

Recommendations Under the RDEIS Owl Context

The Committee recommends that if the RDEIS is intended to primarily address the long-term viability of Sierra spotted owls, that the issues identified in this report be addressed with full involvement of experts on owl biology and ecology. This could be achieved by starting with a formal viability assessment and science consistency analysis as part of the NEPA review process.

The Committee accepts the view that analysis of impacts on furbearers should be a part of the RDEIS even if such an EIS is confined primarily to the California spotted owl.

The Committee recommends that additional fire hazard analyses be included prior to issuing the final EIS. This could include a new alternative, which even if not selected, would clearly display

what actions and investments would be required to reduce the occurrence of large, high intensity fires in the Sierra Nevada.

The Committee recommends that the Forest Service recalculate the projected harvest levels based upon the expected level of riparian protection. Several analytical and modeling concerns are documented in this report. Many of them can be addressed with additional documentation; however, the overstatement of PSQ resulting from inappropriate inclusion of the harvesting impacts of the aquatic/riparian management component is a serious problem. An overstatement of 14-39% is probably very reasonable, but some of the graphics supplied by the EIS team strongly suggest it could be a bigger problem.

The Committee recommends that the monitoring plan be augmented with a discussion of how the Forest Service will incorporate the monitoring program into an adaptive management process. The Committee has mixed views about the adequacy of the monitoring plan itself. Most members feel it probably meets NEPA requirements. Others feel it is inadequate and that this inadequacy is compounded by the lack of standards and guidelines. A central theme to this issue is the apparent distrust in the Forest Service. A team of experts is working on the design of a monitoring program; however, many interested parties are asking for additional monitoring plan material in the RDEIS. Some of the concerns about monitoring could also be addressed by inclusion of additional standards and guidelines and/or performance measures.

The Committee recommends that the Forest Service examine the road density databases being used by the national forest in comparison to those used in developing the RDEIS. The impacts of increased net road mileage need to be analyzed in both a direct and cumulative effects context (including Forest Service and non-Forest Service roads).

The Committee believes it would be most helpful if the assumptions, modeling methodology, alternative selection methodology, and analyses were more completely described in the document. The Committee understands there is a realistic limit to the size of the RDEIS, but some of the current concerns could be eliminated by additional documentation. The Committee regularly cleared up issues by communicating with the EIS team members, who provided important information not included in the document.

Conclusion Under the RDEIS Owl Context

As an EIS focused upon maintenance of California spotted owl habitat (context OWL), the RDEIS is inadequate. This inadequacy must be addressed in a revised or amended document. The Committee recommends that USDA consult with their legal counsel and with the US Fish and Wildlife Service, if it considers proceeding with the RDEIS without further revisions.

Issues Within the RDEIS Ecosystem Context

The Committee also reviewed the RDEIS as a document that identifies and analyzes issues and management strategies from the broad perspective of ecosystem management for the Sierra Nevada national forests (ECOSYSTEM context). Within the ECOSYSTEM context, the Committee considered the RDEIS an analysis of conservation or ecosystem management strategies for the Sierra Nevada national forests utilizing the best existing ecological and social science. In addition

to the issues identified by the Committee under the OWL context, several issues are related to the ECOSYSTEM context. Some of these issues are extensions to the OWL context, and some are specific to this context.

- The number of species or groups of species examined by the viability assessment is inadequate or incomplete (see Viability Assessment in Chapter 3).

- The databases and analysis do not address the spatial relation of one variable to another, making it difficult to determine the effect of alternatives on desired outcomes. (See Spatial Issues in Chapter 3.)

- Late-successional forests (LSOG) are not addressed as a unique resource or ecosystem. No alternative specifically addresses LSOG management (see LSOG in Chapter 3).

- Collaboration with the science community and coordination with other land owners and interests is inadequate (see Scientific Support and Consistency in Chapter 3).

- Methods to be used for adaptive management including how monitoring results and new information will be utilized are missing (see Standards and Guidelines, and the Monitoring Plan in Chapter 3).

- Fire is not incorporated as an ecosystem process in management strategies (See Fuels and Fire Hazard in Chapter 3).

Recommendations Under the RDEIS Ecosystem Context

If it is decided that an ecosystem strategy is desirable, the Committee recommends that well before the next round of forest planning for Sierra Nevada National Forests, a well-planned, efficient, and multi-organizational process be implemented. Such a process need not be a "crash exercise," and should use both SNEP and the RDEIS documents as a basis for proceeding. Many agencies and organizations that talked to the Committee or its members pointed out that such a plan and its supporting analyses and data could be used as a common foundation for many current and projected planning processes. It would also help assure that future Forest Plans for the Sierra Nevada be truly ecosystem management plans with strong scientific, public, and organizational support; and direct links with the plans of other agencies and organizations.

If a conservation or ecosystem management strategy is desired, the following steps are recommended:

- Develop a planning process that includes collaboration with resource agency and scientific community representatives, and coordination with public and private interests.

- Develop a process that incorporates independent scientific review and evaluation of planning products.

- Utilize methods that allow analysis of the spatial dimension of ecosystem dynamics and evaluation of different spatial arrangements of habitat under each of the alternatives.
- Include viability assessments of appropriate representations of species.
- Incorporate a comprehensive strategy for aquatic/riparian protection, management, and restoration.
- Incorporate and evaluate credible alternatives for management of LSOG forest ecosystems.
- Include explicit standard and guidelines or performance measures, identify principles for next planning steps, and provide specific guides for handling of site-specific issues.
- Provide for multiagency oversight.
- Design and implement inventory systems appropriate for monitoring and adaptive management.
- Incorporate a comprehensive monitoring program and adaptive management processes.
- Include all lands in the analyses.
- Include fire as an ecosystem process.

Conclusion Under the RDEIS Ecosystem Context

As an integrated EIS intended to address conservation strategies for national forests in the Sierra Nevada, the existing RDEIS is inadequate. The Committee believes it unlikely that an ecosystem strategy for the Sierra Nevada can be achieved by modifying the RDEIS. Based upon the definition of an ecosystem strategy used by this Committee there are simply too many basic components missing or inadequately developed. When the Forest Service decides where on the spectrum, between the two contexts the RDEIS belongs, the shortcomings identified under the ECOSYSTEM context should be carefully examined. The route to a Sierra Nevada ecosystem strategy may be significantly different than the one followed by the RDEIS.

Relationship Between SNEP and the RDEIS

The charter directs the Committee to examine the RDEIS use of the Sierra Nevada Ecosystem Project (SNEP) report (see Appendix A). The SNEP report was developed by a group of scientists and professionals in response to Congressional direction and managed primarily by university professors. The report assesses the components of the Sierra Nevada ecosystem including current conditions, historical perspectives, trends and future characteristics. The Secretary of Agriculture wanted to know if the information in SNEP was appropriately considered in the RDEIS.

The Committee finds that the RDEIS did not incorporate much of the information produced by the SNEP, including data, management concepts, and analytic tools. Indeed, there is simply no way that the EIS team could have given comprehensive attention to the SNEP findings given the difference in scope and timing of the two projects and the lack of systematic communication between the two teams (SNEP scientists were cautioned not to treat agency employees any differently than other scientists or members of the general public because of the Federal Advisory Committee Act). The alternatives created and analyzed in the RDEIS preceded the completion and reporting of SNEP by many months; no new alternatives were created as a result of SNEP findings.

The SNEP report did provide extensive data, synthesized information, concepts, and models that would have been very relevant to production of a RDEIS addressing broader conservation or ecosystem management strategies. Many examples of this were provided by individual and institutional testimony and by the Committee's own analysis of the SNEP and RDEIS documents. Outstanding examples include the treatment of riparian zones and aquatic ecosystems, management strategies to provide for maintenance of old-growth ecosystems and their constituent organisms and processes, effectiveness of fuel breaks as a stand alone fuel treatment technique, and viability of many additional species.

The incomplete incorporation of the scientific products of the SNEP analysis is probably not a major issue in issuance of the RDEIS if this document is interpreted as an owl-oriented EIS (context OWL). SNEP had very little to say about the California spotted owl. Some of the fire and stand modeling tools developed in SNEP, such as the model by J. Sessions and others, are useful analytic tools but they were not yet operational. Analysis of the character and distribution of LSOG forests might have been useful. Overall, the shortcomings of the RDEIS regarding the owl are not related to inadequate consideration of SNEP findings.

Chapter 3

Issue Discussions

Chapter 3
Issue Discussions

Introduction

The Committee went through a process of identifying issues, real and perceived, related to the RDEIS under both contexts. Some of these issues were not addressed because they fall outside the Committee charter, do not have substance, or the issue simply does not exist and is a communication or documentation problem. The following discussions, written by Committee members, address all the issues determined to be within the Committee charter. Suggestions are provided in some cases on ways to deal with issues, but there may be other appropriate approaches. The Committee is quite clear, in the Chapter 2 discussions, about which issues are significant and have been adequately evaluated.

In the following sections, issues are discussed under major issue headings (not presented in order of priority or significance). The list of 69 individual issues collected during the second Committee meeting can be found in Appendix B. Some sections contain issue numbers, which refer to these 69 issues. Some issues are lumped together or discussed in more than one section; they are not arranged in a numerical sequence.

Analysis Techniques and Modeling

Terms to Know:

SPECTRUM: is a linear programming model used to optimize land allocation and all forms of wood output given constraints such as the need to reserve so much land for owls, or maintain a non-declining flow of wood. It is used for strategic planning at the national forest level and its output (e.g. so many acres of *x* type harvested in *y* year) has no spatial specificity.

RELM: is a linear programming model, which uses the land allocation solutions of SPECTRUM and applies them to watersheds within a ranger district of the national forest. Watersheds have unique constraints such as limits on the proportion of a watershed that can be disturbed in any year, which may limit the ability to achieve the SPECTRUM-predicted outputs. RELM output includes maps of ranger districts showing all the watersheds and the degree to which each of them could achieve a SPECTRUM output given their own unique constraints.

FVS: is a generic term for the Forest Service Forest Vegetation Simulator. This individual-tree stand-growth projection model is used to predict stand characteristics (number and size distribution of trees) resulting from management activities and to project stand yield. The stand characteristics are input to SPECTRUM analyses and are used to define owl habitat, California Wildlife Habitat Relationship (CWHR) class, and large tree numbers. Different variants of the simulator are available for different forest types. The SORNEC and WESSIN variants were used in the RDEIS.

Many comments to and subsequent discussion by the Committee reflected limited confidence in the model output as a basis for decisionmaking. Some concern stems from the lack of specificity of the modeling system, omission of a few critical ecological processes, omission of lands outside the national forests, insufficient description of the analytical procedures, and projections displayed without error terms.

The analyses supporting this RDEIS do include "insurance" margins for discrepancies between prescribed and implemented management actions. RELM analyses were conducted to test the feasibility of disaggregating the SPECTRUM solutions to each ranger district. Whereas these procedures indicate that the solutions can be implemented, the lack of spatial resolution at finer scales and the omission of damaging agents and outside lands create uncertainty regarding whether RDEIS goals could actually be met or whether a different ranking of the alternatives would have resulted.

Lack of Specificity

A major recurring issue is the limited attention to spatial relations among ecosystem processes. This concern is discussed more fully under "Spatial Issues." A second concern is the lack of specificity in the "Standards and Guidelines." No assurance exists that the management actions actually implemented will be the same or have the same effects on the ecosystem as the actions represented in the simulations. No clear expectations are delineated against which to compare performance.

These limitations arise from two sources: first, from the way the concept of strategic planning is applied in the RDEIS, and second, from the limitations of the SPECTRUM optimization system. Strategic planning has been characterized as setting the "zoning ordinances" for the area. The analogy is apt, because a major product in the RDEIS is a map allocating land uses. For each color on the map, there is a description of desired future conditions and actions that would facilitate that desired condition. However, for most of the ecological and socio-economic processes being analyzed in the RDEIS, the location of the map lines, rather than the acreage within delineated polygons should be the preeminent decision.

The SPECTRUM planning model is not adapted readily to this formulation of the planning problem. The major obstacle is that each ecological process and each management action has an intrinsic spatial and temporal scale at which it can be evaluated. For example, while the effects of thinning on tree increment and mortality may be analyzed at the level of a single stand, effects of harvesting on the quality of owl habitat or on stream sedimentation must be analyzed at the level of an encompassing watershed. And whether a thinning is operationally feasible depends on the size and location of the area to be treated in relation to roads and markets. The site-specific nature of these interactions cannot be captured in relations derived from average "yield tables" input to SPECTRUM and RELM. However, simulation gaming with site-specific data prior to formulating the SPECTRUM planning model could resolve some of the deficiencies identified in the RDEIS.

Another specificity concern relates to the methods used in this RDEIS to assess management effects on the structure and functioning of the ecosystem. These methods make frequent use of

broad, discrete classes defined at arbitrary points in the distribution of continuous variables. In fairness, this practice is widespread in ecosystem science and management assessments, but it can bias conclusions regarding management alternatives.

For example, nesting or roosting stands (RDEIS App. B-13) are defined as having canopy cover > 70%, total live tree basal area > 185 sq. ft./ acre and large tree basal area > 50 sq. ft./acre. Although owl nests are found most frequently in very large trees within full-canopied stands these cut-offs are considerably more abrupt than the natural distribution of owls. A nesting and roosting index based on cumulative numbers of trees arrayed by size would be less arbitrary.

In the context of potentially conflicting objectives, such as high quality nesting habitat and high timber output, breaking the distribution of tree diameters into broad classes favors an alternative that just barely achieves the desired nesting conditions. By using a continuous measure of nesting or roosting habitats, an alternative can be evaluated with respect to whether it maximizes quality of habitat rather than the area meeting a minimum threshold.

Omitted Processes and Indicators

It is prudent resource planning to include at least those species proposed for listing under the Endangered Species Act or considered rare and potentially threatened under current or proposed management. A list of such species would vary among national forests. Thus, the RDEIS could deal with species common to all forests or those that are so threatened that specific indicators of viability are required. The present analysis avoids specific indicators for individual species, relying instead on maintaining a reasonable mix of habitats using the California Wildlife Habitat Relationships (CWHR) classes (there remains some question as to whether they were used correctly in the RDEIS analysis). Whether this is "good science" depends on whether the CWHR classes provide sufficient resolution of key habitat needs. The Committee recognizes that the CWHR classes are not perfect.

Ecological processes that were not addressed in the modeling include the workings of insects and pathogens, and the multitude of processes inherent in LSOG and owl population dynamics. Usefulness of LSOG indicators and cumulative watershed effects were limited by the lack of spatial resolution of data and models. These problems apply equally in both the OWL and ECOSYSTEM contexts. Although the impressive system developed by Sessions, Johnson, and others for SNEP incorporates many of the processes missing in the RDEIS analysis, their model still needs further development before being operational as a routine tool for analysis.

To resolve some of these problems, the RDEIS analysis could be augmented using more detailed analyses of randomly selected areas of the national forests. The selected areas would be the first stage of a multi-stage sampling design. The map layers upon which the SPECTRUM analyses were based would provide the frame for the first stage of this design. Each successive stage would focus on smaller areas of increasing spatial resolution. Specific ecosystem processes would be modeled at the spatial resolution appropriate to the process. In this manner, the implications of the coarse, larger management scheme on processes that operate at a finer scale could be determined. For example, this approach would allow an evaluation of the effectiveness of the riparian and aquatic RDEIS component on lands receiving silvicultural prescriptions.

Intermingled Ownerships

Conditions and activities on non-Forest Service lands within and adjacent to the national forests were not considered in analyses of species viability, cumulative effects on watershed values, and in the evaluation of proposed roads. Without consideration of such effects it is difficult to assess the quality of owl habitat within the national forests or the effect of the proposed activity on watershed or aquatic health. Furthermore, this omission could have a major effect on the ranking of alternatives. The need for consideration of the likely actions of all landholders within a watershed in order to evaluate the consequences of management actions on populations and ecosystem processes was a major finding of the SNEP report.

Because Forest Service databases generally do not include data on non-forest lands and certain data on private lands are often not available at all, it is difficult to evaluate the importance of practices on non-Forest Service land. However, the recently-developed SNEP GIS data bases are now available and, in concert with the RELM output from existing analyses (see Spatial Issues), could be used as a starting point for such an evaluation with respect to ecosystem values and owl habitat quality. At the very least, assumptions about non-public lands must be explicit in order to complete adequate cumulative effects analysis in the EIS.

Inadequacy of Documentation

Methods of analysis and their associated assumptions are not described in sufficient detail to assess their validity. In addition, they are not sufficient for the public to judge what is proposed and evaluate the RDEIS. Too often, the reader is referred to the "Planning Record." If the public generally perceives the RDEIS as vague or inadequate in description, the RDEIS will not be credible or consistent with the intent of NEPA.

The Committee found the documentation in the appendices and in the RDEIS text to be insufficient to judge the applications of the SPECTRUM, RELM, and FVS models. After addressing specific questions to the EIS analyst, we found that the models were applied in a technically sound fashion and were appropriate for forecasting tree size and density by vegetation type and structural characteristics, but were inadequate for addressing many of the spatially-dependent characteristics that are important determinants of the ecological value of those forest characteristics for habitat.

The lack of sufficient detail in modeling and analysis description could be resolved by adding as a supplement to the RDEIS a more explicit listing of the modeling assumptions and the protocols for modeling in the text of the RDEIS itself. The current explanation of the modeling in Appendix B is only understandable if one is familiar with Linear Programming (LP) and current USFS models. An explanation of LP models, their objective functions, and the significance of the order of objective functions is necessary. This listing and explanation could be accompanied by examples and should avoid the use of technical jargon. In addition, Larry Wilson's paper on the vegetation modeling for this RDEIS, from the "Proceedings: Forest Vegetation Simulator Conference (1997)", could be included in the appendices.

Modeling of Vegetation Development and Silvicultural Effects

Three aspects of the vegetation modeling were identified as issues: 1) the land base area to which the silvicultural prescriptions will be applied; 2) the reliability of the specific forms of the Forest Vegetation Simulator (FVS) developed for the Sierra Nevada (WESSIN), southern Oregon, and northeast California (SORNEC) for estimating large tree mortality; and 3) the implications of FVS predictions of the numbers, sizes, and crown attributes of the future populations of trees with respect to future fire behavior. As with other modeling concerns, the uncertainty of projections is important here. (Issues 44, 48, 53, 60, 64, 34, and 40)

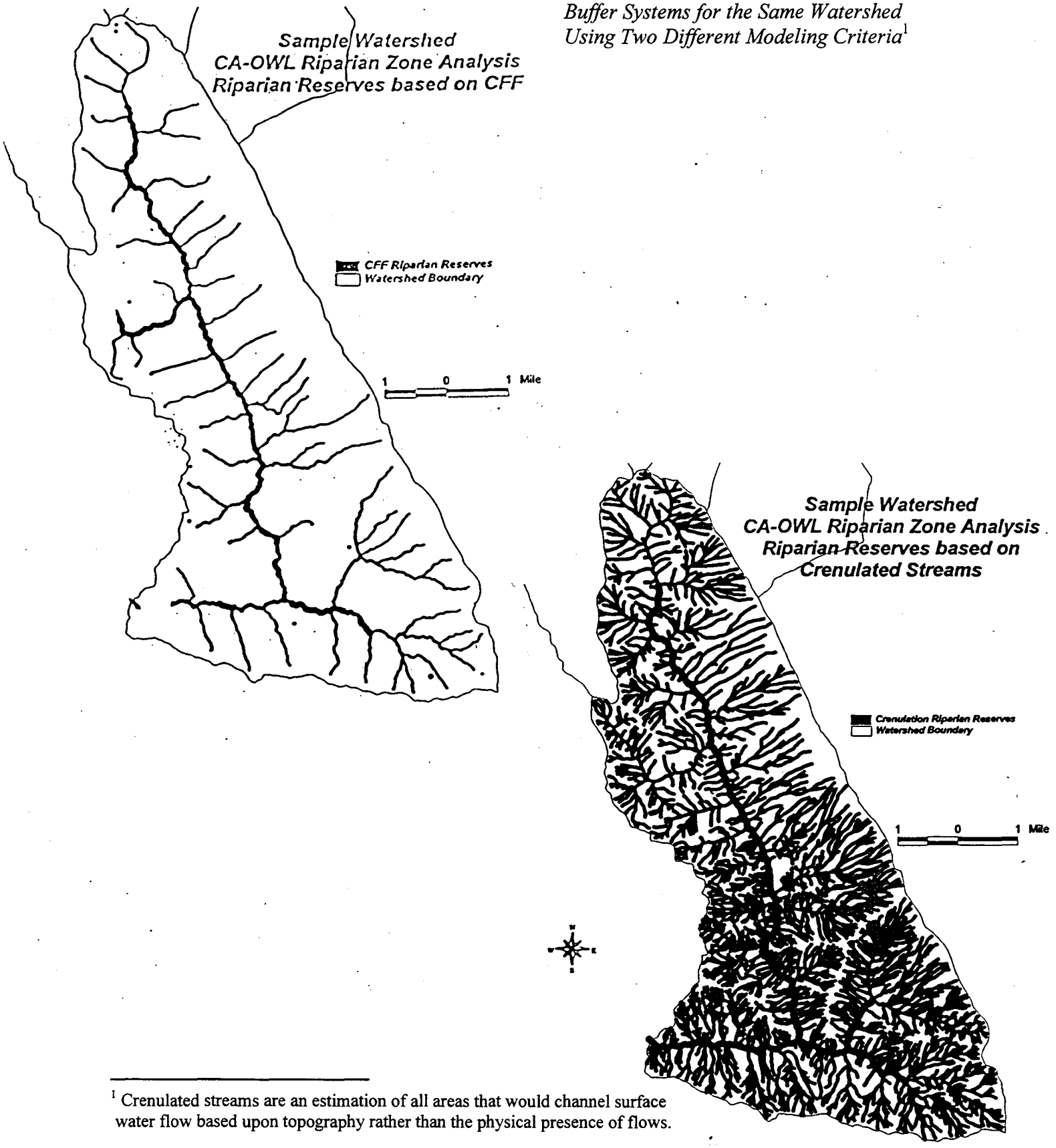
Land Base Area

The area of the land base available for scheduled harvest activities is very sensitive to the definition of riparian zones in the upper reaches of streams. Forest Service staff supplied example maps showing two alternative estimated models of riparian zones on the landscape (see Figure 1). The delineation of Riparian Management Zones (RMZs) along USGS blue-line streams (streams indicated by blue lines on USGS stream maps) is only a lower bound estimate for the area that will be allocated to RMZs rather than the timber base. Use of the lower bound estimate will overstate the amount of timber harvest possible under the various alternatives. The differences in area classification between these two maps would invalidate comparisons of potential timber harvest under each alternative in the RDEIS. (Issues 44, 48)

The Committee determined that the modeling of Riparian Management Zones (RMZs) tends to understate the potential area within RMZs and therefore to overstate the area available for scheduled timber harvest. Only 10-15% of the timber base is included in RMZs in Appendix F-2, but 25-35% is likely to be included when smaller streams are taken into account. The estimated timber base reported in Table F-2 (and modeled as being available in the RDEIS) actually being available for harvest may thus be overestimated if the aquatic/riparian component is implemented as described in the RDEIS. The Committee is concerned that this overestimation of the Potential Sale Quantity could both create unrealistic expectations on the part of the public as well as pressures on managers to reach a PSQ "target" that is unrealistic.

As standards and guidelines are prepared, valid (probability) sampling could be conducted to estimate the area that will be available for scheduled harvest. Because the spatial extent of the ecological processes unique to the riparian zone will vary by landform, the sample should be stratified by landform.

Figure 1: Comparison of Riparian Reserve Buffer Systems for the Same Watershed Using Two Different Modeling Criteria[1]



[1] Crenulated streams are an estimation of all areas that would channel surface water flow based upon topography rather than the physical presence of flows.

Reliability of Forest Vegetation Simulator

The vegetation simulation methods used were "state-of-the-art" at the time the analyses were conducted, nevertheless, these methods do have deficiencies. These deficiencies are critical because estimates of stand development leading to suitable owl habitat and augmenting areas of late-successional and old-growth systems will have a significant influence on indicators used to select among management alternatives.

Mortality of Large Trees

Mortality rates for large trees are the major source of variation in modeling stand development (Stage and Renner 1987). These rates were probably understated in the FVS modeling for all species except ponderosa pine because of effects of insect and pathogen damage. For ponderosa pine, mortality rates in the model runs were increased to recognize effects of bark beetles. Although the Forest Vegetation Simulator (FVS) system was designed to be used with specific extensions to represent episodic effects of insects, pathogens, and fire, versions of these extensions applicable to California were not available until recently and were not used by the EIS team (Teck et al. 1997). (Issues 64, 60)

Concern was also expressed that the trees growing into the critical large size-classes would lack the defects and other attributes of decadence favored by the owl and characterizing LSOG. However, a necessary corollary of the presumed under-estimate of mortality is that the vigor and lack of defects of these trees is over-estimated. (Issue 57)

The Forest Service should consider conducting sensitivity analyses comparing management alternatives with respect to the impacts of damaging agents.

Group Selection and Fire Hazard

The groups (areas expected to be regenerated by the removal or opening of the overstory) in the group-selection method of silviculture were, of necessity, modeled as two small, concentric areas embedded in a matrix of other small, potential groups. Growth of small trees within the areas was reduced compared to the growth that would occur in an extensive stand with no overstory. (Issue 34)

Interactions with fire behavior depend on the extensive edge created by the small groups. The groups of smaller trees will continue to act as fuel-ladders unless the thinning treatments create an isolating buffer. Such buffers would reduce the effective area of the groups. Whether this reduction would reduce growth rates depends on whether the growing space created by the treatment would be offset by the effect of competition from the surrounding stands. For comparison, the SNEP modeling by Cousar, et al. (1997) used the same variants of FVS, but simulated single-tree selection—thereby guaranteeing the existence of fuel-ladders. They also recognized the inherent bias in mortality rates for large trees, but also chose not to invoke the FVS extensions that would have resolved the bias.

Recent research has improved capabilities for FVS to simulate group selection (Crookston and Stage 1994, Stage and Wykoff in press). Unfortunately, these methods have yet to be extended to the WESSIN and SORNEC variants of FVS used for the analyses in the RDEIS. These

modifications would provide a stronger empirical base to replace the ad hoc assumptions required in the method that was applied.

These deficiencies may or may not be adequately compensated by any so-called "insurance" margins built into the analyses, and by the policy of adjusting after major episodes of fire or insect damage. In particular, root-diseases may slip through this mantle of "insurance" because they may be aggravated by group-selection (although less so than by individual-tree selection) and because their damage is not a highly visible event.

Any re-analysis should make explicit use of the FVS extensions for damaging agents. However, to do so would require analytical methods that include more site-specificity and which include a very large number of projections of individual stands in their diverse environments because these FVS extensions contain significant stochastic components.

Uncertainty of Growth Projections

The uncertainty of the FVS projections is not addressed in the RDEIS. It was suggested that stochastic simulation might be used to address uncertainty; however, developing the parameters needed for stochastic simulation requires very long histories of stand development. Unfortunately, such histories are not available for the types of forest stands represented by the FVS variants for California. The uncertainty of FVS projections has however, been evaluated in other western forests types similar to those in California and these provide a fair approximation to the uncertainty that is inherent in the FVS projections used in the RDEIS (Stage and Renner 1987). These analyses of uncertainty have shown that although uncertainty of model estimates does increase with the length of projection (in both positive and negative amounts), they do so less than is typically ascribed to estimates over long time spans. Interestingly, this is because the biology of growth generates compensating changes in growth in response to agents that would cause projection errors, so the system is self-correcting and largely stays on the trajectory predicted by the models used in the RDEIS (Stage and Renner 1987). (Issue 21)

The Range of Alternatives and Their Evaluation

Range of Alternatives

The range of alternatives considered in the RDEIS is inadequate to address several important issues likely to affect forest management in the Sierra Nevada. In particular, the Committee sees a need to develop an alternative explicitly designed to achieve protection of LSOG forests as an ecosystem in the Sierra Nevada. The existing Alternative E has been advanced by the agency as a large reserve strategy, but it appears to be based primarily upon existing roadless areas rather than the distribution of LSOG ecosystems or components. The term "old-growth" does not even appear in the RDEIS glossary and is not defined. Addressing LSOG explicitly in relationship to all of the alternatives (not only alternative E or a new LSOG conservation alternative) could

influence the definition and evaluation of alternatives, and the selection of a preferred alternative. (See LSOG Issues.)

The Committee also notes that none of the alternatives achieves the desired trend in fuels and fire risk reduction. An alternative of this type was apparently developed in preliminary analyses, but was rejected from further consideration due to the high cost necessary to achieve adequate fuels removal and fire risk reduction within five decades. This reflected in part an assumption that all fuels treatments had to be economically viable without any external subsidies or major funding reallocations. That assumption could be relaxed in analysis of an aggressive fuels reduction alternative in order to reduce conflicts with other management goals for wildlife habitat. Such an approach to the design of this alternative would reflect recognition that to pay for a century of fuels buildup will not be solved quickly without major investment from society or significant reallocation of current funds for deferred maintenance.

Finally, the "no action" alternative (as defined under the National Environmental Policy Act) should be based upon an analysis of what would happen in the absence of new management direction. Comparisons between each of the alternatives and the "no action" alternative are therefore generally incorrect in the RDEIS. The agency indicated that Alternative A (Land Management Plans [LRMPs] as they existed before the adoption of the CASPO interim guidelines in January 1993) was selected as the "no action" alternative because of a risk that the CASPO interim guidelines could be overturned in a court challenge based on NEPA. Such a challenge was rejected by the Washington D.C. District Court on August 26, 1997, however, making this claim moot[2]. The CASPO Interim Guidelines were intended to apply for only two years, but there is no "sunset" provision that would return the LRMPs to their status before January 1993. In fact, the Decision Notice and Finding of No Significant Impact for adoption of the CASPO Interim Guidelines described the "no action" alternative for that action in January 1993 as the existing LRMPs[3]. The LRMPs were modified by that decision, however, making the modified LRMPs policy. (See Viability Issues.) This strongly suggests that Alternative G (continuing the existing LRMPs as modified by the CASPO Interim Guidelines) should therefore be treated as the "no action" alternative in the RDEIS.

Alternatives Evaluation

The Committee identified several problems with the application of methods to evaluate the alternatives and the selection of evaluative criteria for comparing the alternatives. These

[2] California Forestry Association v. Thomas (936 F. Supp 13, DDC 1996, CA 94-589) found that CFA lacked standing to bring a suit under the Lujan v. Defenders of Wildlife standard ("injury in fact" requirement was satisfied, but redress through adjudication standard was not) and under NEPA (non-alignment with intent of NEPA). Reliance on Hazardous Waste Treatment Council v. Thomas IV (885 F.2d 918, D.C. Cir. 1989) focused on the economic aspect of the zone of interest for NEPA standing. Reliance on Trinity County Concerned Citizens v. Babbitt (Civ. Action No. 92-1194, 1993 WL 650393, D.D.C. Sept. 20, 1993) could be challenged due to Bennett v. Spear decision (No. 95-813, decided March 19, 1997, which found that Endangered Species Act (ESA) requires consideration of economic consequences of a jeopardy opinion designating critical habitat ("any person" standing)). The CFA case regarding CASPO does not involve the ESA, however, and Bennett is unlikely to modify the finding in CFA.

[3] Decision Notice and Finding of No Significant Impact for adoption of the CASPO Interim Guidelines, pg. DN-4.

concerns fall into three general areas: 1) the translation of a detailed set of evaluative criteria into a summary set of evaluative criteria, thereby losing potential important information for both the public and decision-makers; 2) the relationship between those summary criteria and the probability of achieving management objectives, in particular the ecological objectives that may be characterized by multiple criteria and their relationship to each other; and, 3) the treatment of variability and uncertainty in both the modeling assumptions and the models themselves, which has a significant impact on the impacts and outputs estimated for the alternatives as well as comparisons among the alternatives.

Translation of Evaluative Criteria

Part of the first problem may simply be that the translation process is not transparent in the RDEIS. Approximately 30 summary indicators are described in "Comparison of the Effects of the Alternatives" (S-11 to S-26), for example, and these indicators were apparently selected in response to identified issues of concern. With the exception of the Stand Resiliency Index (SRI), which is not scientifically supported, the indicators are primarily evaluated in terms of desired trends rather than in reference to thresholds of acceptability or absolute goals. Therefore it is difficult to translate the indicators into performance measures in terms of achieving objectives. In particular, these indicators are not readily transferable into statements about species viability.

Although these 30 summary indicators appear in the RDEIS, a slightly different set of 20 summary "Key Indicators" was quantified by the agency in a "Key Comparisons" spreadsheet. It is unclear how these "Key Indicators" relate to the summary indicators in the RDEIS or whether some of the missing summary indicators were included in earlier analysis. None of the Key Indicators address spatial relationships or potential relationships between any of the evaluative criteria. The twelve Key Indicators for Habitat are also collapsed into six indicators in the RDEIS. In contrast, the Biological Evaluation and Assessment (BE/BA) used dozens more criteria. Wildlife specialists developed these criteria for each of the species assessed in the BE/BA. The Committee specifically evaluated the BE/BA for the California spotted owl (pp. 91-101), the marten (pp. 112-139), and the fisher (pp. 139-165) due to both their apparent dependency on old-growth habitat/late seral characteristics and their relatively large home ranges. The evaluative criteria used in the BE/BA for each of these species included several spatial variables. None of these spatial variables were carried forward to either the Key Indicators or RDEIS summaries, yet they appear to be significant determinants of viability according to the evaluative criteria in the BE/BA from the California spotted owl panel and the small carnivore working group. The latter group also ranked each of the DEIS alternatives against their criteria, while the RDEIS team completed the ranking process itself for all other species. (The small carnivore workgroup did not evaluate the RDEIS alternatives.)

Relationship Between Summary Indicators and Management Objectives

The preferred alternative (Alternative D) ranked highly for some of the ecological criteria reviewed in the BE/BA, but it was ranked below several other alternatives for many of the spatially explicit criteria. Alternatives B, E and G better addressed intermingled ownerships (the Tahoe "gap" for example), whereas Alternatives C, E and G ranked higher than D for connectivity in the California spotted owl evaluation. Similarly, Alternatives B and E scored

higher than D for the interconnection criteria for the marten while Alternatives E and G exceeded D for the same criteria for the fisher. In fact, the small carnivore workgroup ranked Alternative D last (along with Alternative A) for the fisher, saying it "would likely lead to their extirpation from Forest Service lands and contribute to a trend toward Federal listing" (BE/BA, pg. 150). This is in direct conflict with FSM 2670.32 under NFMA, which states that "[t]he decision must not result in loss of species viability or create significant trends toward Federal listing" (BE/BA, pg. 4).

The social and economic summary criteria also fail to include important measures of social and economic impact. The summary criteria include measures of timber harvest and salvage, spending on vegetation management, payments to counties and direct employment in the timber industry and the agency. These measures ignore the important findings of the SNEP report, which emphasizes the importance of other sectors of employment and other sources of income as the foundation of the Sierra Nevada regional economy. In particular, the SNEP report identified much greater economic importance for water, recreation, tourism, amenity-oriented migration (including its effects on the construction, finance and health-care sectors) and other services. The effect of the Alternatives on these other areas of employment and income for the region were not addressed in the summary indicators. In fact, the summary indicators may be negatively associated with these other attributes. The Key Indicators and summary indicators do not reflect the more comprehensive discussion of social and economic effects in both SNEP and the text of the RDEIS.

One aspect of the narrative and tabular presentation in the RDEIS (pp. 3-300 to 3-330) is the fate of vulnerable timber-dependent communities in response to the various alternatives that were analyzed. Some communities will be more significantly affected (potentially either positively or negatively) by each of the alternatives due to their specific social and economic relationship to the forest. The SNEP report also differentiated these communities' capacity to respond to threats. Use of the SNEP data could serve as the basis for a finer-resolution assessment of social consequences. The Committee also determined that changes in the timber industry's structure could potentially affect the historic relationship between timber harvests and employment in particular communities. Several mills in the Sierra Nevada have been closed due to consolidations; therefore, harvests are likely to be milled at a variety of locations rather than at mills in communities closest to the sales.

Uncertainty and Variability

Finally, the issue of uncertainty is not addressed adequately in the evaluation of alternatives. The agency recognizes its importance, however, and this is particularly important for the fire assumptions. No sensitivity analysis was reported to determine the importance of any of these sources of uncertainty:

1) variation in underlying variables;
2) reliability of estimation of variables;
3) variation in relationships;
4) reliability of estimation of relationships; and
5) variation in outcomes.

Uncertainty about implementation (including budget) could clearly affect outcomes, so it is also an important variable. Alternative assumptions or model specifications could potentially affect both the absolute estimates of attributes and the relative advantages of each alternative. The agency could therefore conduct such analysis and report the results to decisionmakers and the public. Point estimates for each of the evaluative criteria fail to recognize the role of uncertainty.

Changes in key assumptions would change the ranking of the alternatives, for example, due to the sensitivity of model outputs to the fire assumptions. Some of the alternatives were designed specifically to respond to different fire assumptions, so this is not a surprising result. Minor differences in the outcomes (all of the alternatives received aggregated scores of at least 86% of the preferred alternative in the Key Comparisons analysis) are dominated by 250-300% variation in the fire rates. Different fire rate assumptions therefore tend to favor different alternatives. This is not apparent from the RDEIS. The analysis underlying the RDEIS relies upon a particular set of fire assumptions, including an assumption representing an upper bound estimate on the percent of all burns that are stand-replacing events. This assumption will tend to overstate the benefits of vegetation management for reducing potential habitat loss due to fire. Alternatives with more intensive vegetation management will therefore tend to score higher across the evaluative criteria due to the influence of this assumption. Moreover, the delineation of Riparian Management Zones (RMZs) along USGS blue-line streams (streams indicated by blue lines on USGS stream maps) is only a lower bound estimate for the area that will be allocated to RMZs rather than the timber base. This assumption will tend to overstate the amount of timber harvest possible under the various alternatives. Together these assumptions could lead to significant errors in estimating the relative desirability of the alternatives as well as expected outcomes. The Committee therefore believes the agency should consider testing the sensitivity of its estimates to the fire assumptions and report those sensitivity analyses. Further sensitivity analysis is probably necessary for other variables that we have not identified. Neither the public nor decisionmakers can use the RDEIS until such an analysis has been completed, because the proposed RDEIS is based upon a particular set of modeling assumptions. For some of the ecological processes, the variation of the deterministic predictions may be more relevant to the evaluations of the alternatives than comparison of merits. Careful sensitivity analysis is therefore particularly important in this case.

Standards and Guidelines and the Monitoring Plan

A common theme throughout the Committee deliberations and outside contacts was frustration over the lack of specific direction and commitment in the RDEIS. The Committee has mixed views on the adequacy of the monitoring plan. Nevertheless, it is very difficult and in some cases impossible to determine what specific resource management actions will occur, how the landscape will look, or which measures will be used to determine the consistency and quality of implementation. This problem is directly related to the lack of standards and guidelines or other specific direction in the RDEIS. The Forest Service developed the RDEIS as a descriptive document, not a set of prescriptions. The Forest Plans are expected to detail the specifics of implementation under the "vision" and broad direction in the RDEIS. The Committee feels there

is an interrelationship between lack of standards and guidelines, concerns about the monitoring plan, and the lack of performance measures and process standards. The issue is compounded by lack of trust in the Forest Service.

Standards and Guidelines

The RDEIS provides few standards and guidelines for implementation of the preferred alternative. The stated intent of the RDEIS is to be "descriptive" rather than "prescriptive," and to evaluate and adjust performance through monitoring and an adaptive management process. Neither the monitoring nor the adaptive management process is described in sufficient detail, however. Concerns were raised that the RDEIS is too vague regarding outcomes on the ground, as well as the status of the resource after implementation of alternatives. This lack of specificity makes evaluation of some aspects of the EIS difficult.

The aquatic/riparian component outlined in the RDEIS provides a case in point. It is provided with very few specific standards and guidelines, and performance measures are to be focused through the monitoring plan (currently not completed). The aquatic/riparian component is to be implemented and corrected through an adaptive management process, which is not specifically articulated in the RDEIS. Consequently, no tangible measures of expected performance are displayed in the RDEIS for the public to be able to determine the adequacy of the aquatic/riparian RDEIS component.

A thorough discussion of the principles and processes by which standards and guidelines will be developed is also lacking. In addition, the specific means by which monitoring data will influence management activities are not explained. In some areas, such as thinning activities, the language on standards and guidelines provides considerable management flexibility without appropriate safeguards to owl habitat.

The RDEIS should provide tangible performance measures somewhere in the document. This can be accomplished either through the addition of more specific standards and guidelines or through the display of measures in the monitoring plan that more specifically focus performance in relation to the goals.

Monitoring Plan

Monitoring is part of a program of adaptive management whose goal is to determine if management actions are achieving management objectives and to provide managers with information that might lead to adjustment of those actions or objectives (Lee 1993). The Committee members do not share a common view on the adequacy of the monitoring plan in the RDEIS. Nonetheless, the Committee commends the EIS team for recognizing the importance of monitoring to the long-term success of the proposed management program. Also, the Committee recognizes that this part of the RDEIS is intended primarily as a roadmap for the development of a more formal monitoring program.

A team, which includes both National Forest System and Research Station employees, is currently working on a complete and detailed Monitoring Program to be completed in 18

months, and team leader Pat Manley shared the existing outline and effort that has been developed since the RDEIS was written. The Assistant Regional Forester indicated that a significant increase in funds ($800,000 to 1,000,000 per year) for monitoring program development was made available starting last year. The Committee's comments are thus intended to improve that planning progress.

Discussion among Committee members centered on the level of detail appropriate to a monitoring plan to be included in the RDEIS. The Committee agreed that this area of the RDEIS could be strengthened considerably by a more detailed consideration and explanation of the ***process*** by which the detailed monitoring plan will be developed and some indication of the measurements that would be tracked. The list of potential monitoring objectives in the RDEIS is quite detailed. Even with increased funding for this activity, resources will permit monitoring of a very limited subset of the items listed in Appendix P. By what process and with what criteria will managers select from among these objectives to create a unified monitoring plan? If certain criteria are dropped, how will this affect the direction in the plan?

At least as important is the need for consideration of how and what monitoring information will be fed back into the management process. How can the relevant institutions ensure rapid processing and management of monitoring data? What organizational structures need to be established to ensure that managers are informed of monitoring results? By what decision criteria will data be used to modify management practices?

Some monitoring details depend on selection of specific alternatives and cannot be resolved in the context of the RDEIS; however the principles and procedures by which an adaptive management program and monitoring plan will be developed could certainly be explained in more specific terms than exist in the current RDEIS.

Viability Assessment

Definition of Issue

The goal of the RDEIS, as well as a requirement of the National Forest Management Act is that "viable populations" of all vertebrate species are maintained throughout the planning area. Because the RDEIS's primary tenet is the continued persistence of the owl on the national forests of the Sierra Nevada, the analytical approach, data support, and execution of its population viability assessment are central to the plan's credibility. In addition to the spotted owl, impacts of management on furbearing mammals and other species are also relevant to the RDEIS. Although population viability analysis is often difficult because it requires critical life history information that is often unknown, the spotted owl is one of the most intensively studied wildlife species in the world (Gutiérrez et al. 1995; Forsman et al. 1996), and this information was available to the EIS team.

Spotted Owl

Relevant biological information on the current status and biology of the spotted owl was gathered under the auspices of the California Spotted Owl Technical Assessment Team (CASPO; Verner et al. 1992). In particular, the habitat characteristics, home range size and early estimates of owl population processes were summarized. Based on this review, CASPO proposed an interim strategy that precluded loss of management options for the owl in the short term (5-10 years) until additional information and/or analyses dictated a more permanent conservation strategy for the owl.

Among CASPO's important findings were that the owls were found in contiguous patches of forest; they nested and roosted in areas with high canopy closure and uneven aged (size) tree diameter distributions; and coarse woody debris in the form of large logs and snags was often found within their habitats. The majority of nest sites were in very large diameter trees (>45"). Most sites occupied by owls were either in old growth/late seral stage forests, or in forest patches with residual elements of presettlement forests. The owls had large home ranges. These ranges were largest in the northern part of the Sierra Nevada. The CASPO assessment showed that the owl was widely distributed in the Sierra Nevada, but the entire population was small relative to the northern spotted owl. Because the owls were widely distributed with no obvious gaps in distribution, such as those found in the northern spotted owl's range, CASPO assumed that maintaining elements of the owl's habitat in the matrix between owl core areas (i.e., protected activity centers or PACs) was a key to the interim strategy. Had the CASPO team been faced with the same assessment task but with the expectation that the matrix between known owl PACs would lose many of the key components of owl habitat, there is a strong possibility that the team would have proposed a different conservation strategy. The EIS team relied heavily on the information gathered by CASPO, including discussions with some members of the CASPO team; however, fundamental deviations from the CASPO guidelines were chosen for the RDEIS preferred alternative. (Issues 6, 11, 63)

One of the more striking deviations is the raising of the diameter limit for complete tree protection from 30" in CASPO to 40" in the RDEIS. CASPO selected the 30" diameter limit in habitats typically used by owls for several reasons including: 1) they would serve as replacement trees for the rare old trees that were the residual elements of presettlement forests; 2) the uneven aged (size) diameter distribution typical of owl habitat on national forests in the Sierra Nevada were partly the result of the trees found in the 30-39" diameter classes; 3) a large cohort of large trees would be necessary to maintain the large coarse woody debris (logs and snags); 4) the structural diversity conferred by the more abundant 30-39" diameter trees would, in combination with the trees >40", maintain nesting and roosting habitat with respect to nest sites, perch sites, etc.; and 5) the multistoried structure resulting from these diameter distributions may have added benefit for ameliorating thermal regimes of interior forests which may be important for roosting owls (Barrows 1981; Ganey et al. 1993; Ting 1997).

The RDEIS requires retention of some 30" trees when harvesting by thinning, but not when regenerating the openings using the group selection silvicultural system. The decision to relinquish the 30" diameter limit required by the Interim Guides is not supported by 1) new information on owl habitat requirements; 2) additional habitat analyses of existing owl habitat

data, which led to a different conclusion than that reached by CASPO regarding habitat use by the California spotted owl; or 3) population information showing stable or increasing owl populations where timber harvest is occurring. Further, the removal rules do not allow a detailed understanding of the relationship between resulting stand composition and that required for owl habitat.

In addition to the 30" diameter limit, CASPO guidelines provided for basal area retention of trees in the largest size classes. This was necessary where 30" trees were either absent or rare, and failure to protect the largest trees present would slow or eliminate the potential for establishment of suitable owl habitat. Thus, the RDEIS preferred alternative might produce stand structures quite different from those prescribed by CASPO or currently present in suitable owl habitat. Furthermore, the RDEIS provides no critical spatial or temporal examination of future forest stand structure in both owl habitat and potential owl habitat in the context of owl viability. (Issues 4, 5)

Cessation of the 30" limit in the RDEIS appears to be based on predictions that in the next century there will be more trees in the 30"+ size class than exist today. Independent of the potential problems with modeling projections of tree growth, this departure from known owl habitat use patterns demands a comprehensive analysis of viability that includes the spatial projections of management activities in relationship to owl distribution and habitat. Further analyses of habitat use should provide clear and convincing evidence that this departure will provide suitable owl habitat. (Issues 4, 5, 11)

Such an analysis should include additional measurements for spotted owl habitat such as the tree diameter distribution of the forests occupied by owls, the spatial distribution of owls and their area (home range) requirements. For example, the uneven aged/diameter distribution of owl habitat, high canopy closure associated with owl habitats and large trees distributed among all the large tree size classes (>24") would have to be included in the analysis.

It is well understood that owls occupy sites that have uneven diameter distribution, dominated by large trees. Definitions of desirable stand structure in terms of the cumulative distribution of tree diameters are (and have been) available to guide such assessments. Furthermore, the majority of the owl habitat is in the relatively narrow mixed conifer zone. Thus, a viability analysis should spatially and differentially weight the contribution of this habitat to the overall viability of the Sierra Nevada owl population. Finally, the distribution and amounts of disturbance in a spatial context along with a range of uncertainty regarding owl responses and management action needs to be incorporated into the alternative rankings. This was not done in the RDEIS.

The linkage between the tree modeling effort and the spatial distribution and abundance of habitat with owl distribution is not clearly established in the RDEIS. Thus, there is no way to judge where habitat is located in relation to the current distribution of owls. Further, there is no way to assess the habitat structure at sites of the projected future owl habitat (see below). (Issues 6, 11)

The impacts of group selection silviculture on owl habitat have not been studied on public lands in the Sierra Nevada. Although the Forest Service employed group selection silviculture in the

Sierra Nevada several decades ago; it is impossible to evaluate its effect retrospectively because of the lack of spatially explicit records of these activities. This silvicultural prescription requires a great deal of spatial specificity to assess the impacts of habitat fragmentation and increases in roads on owl habitat structure (i.e., both within and among habitat variability), change in thermal properties of interior forests caused by opening gaps in the forest, and the potential for increasing habitat for predators (great horned owls), and competitors (barred owls). Depending on the size and distribution of group selection units, the resulting structure of forest patches may tend to be even aged and atypical of our current understanding of owl habitat. (Issues 4, 5, 11, 16)

Scientific Nature of Viability Assessment

The viability analyses performed by the team were subjective and not scientific. The EIS team correctly pointed out in a letter to the Committee that the courts do not require viability analyses be quantitative. Nevertheless, the changes in silvicultural prescriptions discussed in the section above affect the quality of the owl habitat. Therefore, in the owl context, changes in the silvicultural prescriptions should have been deliberate decision variables in the planning process for owl habitat. Instead, the decision variables were how many acres to treat in which decade. (Issue 11)

Misinterpretation and Non-Use of Existing Information

As the EIS team correctly pointed out in its most recent communication to the Committee, estimation of lambda (a statistic based on birth and death rates that estimates the annual rate of population growth) does not demonstrate cause and effect. Although the estimation of lambda has some ambiguity when used to judge the health of spotted owl populations, it is the only population dynamic criterion available based on empirical information (see additional comments on owl population dynamics below). Thus, no new information has been brought forth in the RDEIS counter to the conclusions of CASPO (relative to habitat associations). Further, more recent information on owl populations available to the EIS team indicates the owl populations in the northern and southern Sierra Nevada are declining. (Issue 11)

The RDEIS does not correctly interpret current data on owl populations. For example, table 1B from Noon et al. (1996) is copied in a recent communication from the EIS Team to the Committee as an example that the census population (the number of owls counted on Noon et al.'s study area) of owls was showing an upward trend, whereas lambda (based on estimates of birth and death rates) was showing a downward trend. The implication is that Noon et al.'s counts constituted estimates of owl density; however, this table is not a count of owls within a finite area, but rather reflects the owls detected over time as survey efforts increased and additional owls were being reported by survey crews and others. (Issue 11)

The RDEIS discussion of uncertainty, modeling, and weather variation is also in error. First, expression of uncertainty is appropriate and honest science. Secondly, no modeling connection between weather variation and variation in vital rates has been made for the California spotted owl although it has for the northern spotted owl (Franklin 1997). Third, in modeling viability assessment, a general finding is that the greater the variation in vital rates the more at risk a species or population usually is. This increase in risk occurs because the populations are more

susceptible to deleterious stochastic events. The EIS team also seems to be confusing process variation with sampling variation, a critical problem when assessing population dynamics. Land ownership patterns in the Sierra Nevada are not uniform. Alternating blocks of public and private land exist in large areas. The implications of these ownership patterns on spatial distribution, density, and connectivity of spotted owls, furbearers, and other species is not assessed. This may be an important issue for owls because nesting habitat for owls is largely missing from the private ownership sections in at least one area of the Central Sierra Nevada (Gutiérrez 1994). If under some alternatives, the owls were displaced from this area of the Central Sierra Nevada, then one of the key criteria that the CASPO team used to argue against establishment of a reserve structure for spotted owls in the Sierra Nevada (i.e., no gaps in the current distribution of owls), would no longer be valid. These areas also have important implication for the further isolation of furbearer populations in the Sierra Nevada. (Issues 4, 5, 35, 67)

Without knowledge of the distribution in space of known key components of owl habitat it is impossible to evaluate the alternatives. Individual tree growth models used by the EIS team project an increase in the number of 30" or larger trees in the future. Without explicit knowledge of their projected relative location and density, however, one cannot evaluate the influence of the loss of currently old and large trees relative to the recruitment of young and large trees over the course of time. Are the newly recruited large, young trees uniformly distributed as small even aged patches over space? Given the mortality rates of the very large (>40") trees, how many of the estimated 16 million large, old trees currently present in the Sierra Nevada will be present in 100 years? Further, what will be their spatial distribution? These questions are important because large, old trees are in low density over much of the Sierra Nevada, but almost always form a component of owl nesting and roosting sites (Bias and Gutiérrez 1992; Verner et al. 1992; Moen and Gutiérrez 1997). (Issues 4, 5)

A second component related to the spatial issue is the distribution and number of small clearcuts (i.e., group selection harvest areas). This is important because of the fragmentation issues associated with clearcuts. Biologists have hypothesized that landscape-scale fragmentation (and subsequent loss of habitat) can have a negative effect on owl populations if a threshold is crossed (e.g., Landé 1988). Some empirical evidence shows that there is a fragmentation threshold in northern spotted owl populations (Johnson 1992; Franklin 1997). The impact of fine scale fragmentation (both relative to size of harvest unit and their spatial distribution) in combination with thinning, such as proposed in the EIS preferred alternative, has not been evaluated but is becoming an issue of greater concern to ecologists (Losos et al. 1995; Schonewald-Cox and Buechner 1995; Yahner and Mahan 1997). It is well known that fragmentation and loss of habitat at larger scales (e.g., clear cutting *per se*) in the Pacific Northwest had deleterious effects on spotted owl populations and consequently led to the listing of that subspecies (Thomas et al. 1990; USDI 1992). One of the primary facts that led to the CASPO strategy was that massive clear cutting had not occurred in the Sierra Nevada in a manner spatially resembling the Pacific Northwest situation (Verner et al. 1992). Fine scale fragmentation may have other unknown effects on spotted owls. For example, it may facilitate the occupation of sites by spotted owl predators or competitors (USDI 1992; Dark et al. 1998). (Issue 11)

Increased road density is required by the preferred alternative in order to implement extensive

small clearcuts (see Road Issues). The RDEIS does not critically evaluate the cumulative effect of habitat loss due to harvest and road building; nor does it critically examine the effect of its contribution toward habitat fragmentation on species. In addition to their effects on water quality and riparian habitats, roads lead to a direct loss and fragmentation of habitat. Recent studies in Washington suggest that owls living near roads are under higher stress than those living away from roads (Wasser et al. 1997). Roads may facilitate the movement of predators, competitors, and alien species into interior forests. (Issues 12, 16, 69)

Furbearers

The EIS team relied on an expert panel to assess the impact of the DEIS alternatives on small carnivores (furbearers) in a draft plan. This was the only panel that used the objective evaluation model employed successfully in other planning processes. They rated the DEIS Alternative D (which, with some changes, became the preferred alternative in the RDEIS) among the poorest regarding impacts on furbearer. The preferred alternative will result in a fragmentation of forests, which could degrade habitat for fisher and martin. Furthermore, removal of trees in the 30-39" class will eliminate the majority of den and resting sites for these animals. The fine scale fragmentation may further exacerbate the lack of connectivity between the northern and southern Sierra Nevada. Fishers, in particular, are nearly extirpated (or may be extirpated) from the northern Sierra Nevada. The furbearer panel concluded that habitat provided by the DEIS Alternative D (as well as A; page 150 of Biological Evaluation and Assessment) "would likely lead to their extirpation from Forest Service lands and contribute to a trend toward Federal listing." The Forest Service received a petition to modify Sierra Nevada LMPs in 1994 in order to address furbearer viability in accordance with NFMA and the agency has officially taken the position that the issue will be addressed in the Cal Owl EIS. This issue is therefore relevant under both OWL and ECOSYSTEM contexts due to NFMA's requirements. (Issue 46)

The Relationship Between the RDEIS and Previous Endangered Species Act Listing Decisions

Three key ingredients played important roles in the listing of the northern spotted owl: 1) extensive loss of habitat in the past with projected future loss of habitat due to proposed forest management plans; 2) declining owl populations (as estimated by lambda); and 3) failure of existing regulatory mechanisms (NEPA and NFMA) to protect the owl. (Issue 63)

Three important factors led to the listing of the Mexican spotted owl: 1) the association of the owl with either old forest or elements of old forest (and with forests that were uneven aged), 2) the projected future loss of owl habitat due to even-aged silviculture, and 3) the failure of existing regulatory mechanisms to protect the owl (NFMA).

It is reasonable to assume that an acceptable EIS for the California spotted owl must address these elements as well. The Committee believes that the RDEIS does not consider all data relevant to these issues, and errs with respect to its judgement of the importance of other data in the selection of a preferred alternative. It appears that in the RDEIS, most of the elements that led to the listing of other spotted owl subspecies are currently present. Without a full

consideration of these issues and use of the extensive existing owl data, the RDEIS probably will not receive general support of scientists.

Fuels and Fire Hazard

A consistent criticism of the RDEIS is its treatment of fire hazard, especially over the short term (10-20 years). Many interested parties identify fire hazard as the most important problem related to management of the Sierra Nevada and implementation of the preferred alternative. The RDEIS assumes that timber harvest will reduce the fire hazard if fuels are appropriately treated. However, SNEP found that untreated logging slash has significantly contributed to increased fire hazard in the Sierra Nevada in the past. Moreover, Region policy only requires fuel treatment to pre-harvest levels and only in five years. Fire hazard can therefore increase even with fuel treatments under current policy. There is a high reliance on mechanical fuel treatment versus prescribed burning in the RDEIS. There is virtually no difference among alternatives in terms of fire hazard impacts. There are no standards and guidelines for fire hazard targets. (Issues 7,8,9,13,14,41)

This high priority issue may be dealt with by: 1) developing a new alternative or 2) modifying an existing alternative to show a positive effect on severe fire potential reduction. High public concern coupled with the lack of an alternative addressing that concern make this issue highly significant in both the OWL context and in the broader ECOSYSTEM context.

Little or No Difference Among Alternatives on Fire Occurrence and Effects

None of the alternatives provide the desired outcome for five of seven summary indicators of risk for high-severity fire, and no differentiation between alternatives can be made for the other two. In fact, all alternatives show an increase in the number of acres burned by wildfire and acres of stand replacing mortality; both opposite of the desired trends. Since the analysis assumes that acres disturbed by wildfires have less hazardous fuels, the more acres burned, the better an alternative appears. It is counterintuitive for an increase in wildfire acres to be considered a positive measure of wildfire potential reduction. At least one alternative should be designed to decrease trends for both stand replacement mortality (mortality of a stand of trees, which initiates forest succession or regrowth) and wildfire acres burned. (Issue 27)

Fuel Measurements Inadequate

Fuel reduction treatments in the RDEIS are inadequate, are inappropriately measured, and have little impact on short-term fire hazard. Fuel activities include defensible fuel profile zones, prescribed burning, and removing residues and small stems for use as biomass materials. Defensible fuel profile zones are used in Alternatives D and F, although there are questions about their effectiveness in stopping catastrophic fires. Acres treated in the zones decrease over the decades, indicating that once established, zones are not maintained. Prescribed burning is used only in Alternatives D, E, and F; and decreases steadily over the fifteen decades. Most fuel

treatments rely heavily on mechanical means rather than burning, ignoring the ecological role fire plays in ecosystems. None of the fuel treatments reduce wildfire acres or stand replacement mortality. Instead of relying on direct measures of wildfire reduction such as number of acres of stand replacement mortality, the RDEIS emphasizes indirect measures such as acres treated by harvest activities. It would be better to evaluate the effectiveness of the fuel treatments by seeing how the treatments affect wildfires rather than just assuming that the number of acres treated is an adequate measure. In order to compare alternatives, the RDEIS should use only wildfire acres and stand replacement mortality acres out of the suite of measurements. Assumptions about stand replacement mortality should also be modified to reflect a range of likely outcomes rather than the maximum outcome possible. The science to support increased prescribed burning is extensive and has largely not been used by the RDEIS. Prescribed burning needs to be greatly expanded in at least one alternative in order to meet ecological objectives and reduce severe fire potential. (Issue 41)

Fuels Management (Slash Disposal) Policy; and Methodology Describing Relationship Between Group Selection and Fire Hazard

Fuel treatments are also included in silvicultural activities. Thinning is the dominant treatment during the first two decades for all alternatives, especially in Alternatives A and F. Nothing indicates, however, that markets exist for the resulting material. The acres of plantations increase for all alternatives. Plantations are assumed to reduce severe fire potential when, in fact, they actually make matters worse because they result in dense stands with uniform canopies. Timber harvests increase for Alternatives A, D, E, and G, whereas they decrease for Alternatives B, C, and F. The RDEIS assumes that timber harvests will reduce fire hazards within five years if appropriately treated; however, Region policy only requires fuel treatment to pre-harvest levels. The effect of fuel treatments in group selection stands would be diluted in the overall landscape and would not be expected to affect wildfire acres or stand replacement mortality. (Issue 8, 34)

Conflicts Over the Extent of Fire Effects on Habitat

The RDEIS inadequately addresses fire effects on spotted owl habitat. This is an issue of high priority since catastrophic fire can lead to the loss of forest conditions associated with spotted owl habitat and potentially critical habitat gaps. Information from the California Spotted Owl Technical Assessment was not used, nor was material from SNEP. The RDEIS does not indicate how much suitable owl habitat is subjected to wildfire or stand replacing mortality. (Issue 13)

Although the standards and guidelines permit light underburning in PACs and SOHAs, only Alternative G makes a direct statement about allowing underburning in habitat areas. It goes on to state, however, that light burns would have minimal effect on reducing fuels and stand replacing fires. It can be inferred that Alternatives B and E would allow prescribed burning to occur in owl habitat, but this is not stated explicitly. Alternative F makes an indirect reference to fuel treatments stating that deferred areas such as PACs and SOHAs would be protected by treating fuels in adjacent areas; Alternatives B and D state that habitat alteration (fuel treatment) would be avoided in owl habitat. Alternative A makes no mention of fire and owl habitat.

Use of Stand Resiliency Index is Untested

The stand resiliency index (SRI) used to measure resistance to high severity fires is untested. Although this is a low priority ECOSYSTEM issue, it is real since the index is one of only two measures that shows the desired trend for reduction in the potential of severe crown fire. No documented science was used in the determination of either the index or its applicability to crown fire. The numerator assumes a relationship between number of trees per acre and crown bulk density, but the relationship is not provided or referenced. Similarly, the denominator assumes an undocumented relationship between average quadratic mean diameter and height to live crown base. In addition, no rationale is provided for the arbitrary value of 3.75 for the index as an accepted threshold. (Issue 40)

A new alternative could be developed that shows what it would take to reduce acres burned by wildfires that result in high stand mortality. Prescribed burning could be increased in at least one alternative to achieve that result. The stand resiliency index could be removed from the analysis and all alternatives should be compared using only wildfire acres and stand replacement uncertainty.

Late-Successional Old Growth (LSOG)

A major issue with the RDEIS is its failure to address late-successional, including old-growth (LSOG), forest ecosystems either as an "affected environment" (or as a resource for evaluation as an element under all alternatives) or as a primary objective of a specific plan alternative.

In the RDEIS, LSOG forest ecosystems are not recognized as an element of the Sierra Nevada forest landscape. Old-growth forests are not identified as a resource nor are any definitions of such forest ecosystems provided, either from numerous Forest Service documents or other sources, such as the SNEP report. Individual structural elements characteristic of late-successional forest conditions are considered in the SNEP report and CWHR categories, which have some parallels with LSOG forests, are considered in the RDEIS. (Issues 52,55,57)

The Forest Service suggested, in testimony to the Committee, that Alternative E in the RDEIS is focused on old-growth forest ecosystems. This alternative emphasized the maintenance of continuous forest cover. It provides for a series of 40 reserved areas in the national forests of the Sierra Nevada and for retention of forest areas inventoried as consisting of large trees (> 24 inches d.b.h.) and high canopy cover (>40%). Management allowed within the reserved areas is limited to prescribed burning.

Alternative E fails to meet the criteria of a credible, old-growth alternative on several grounds. First, it does not identify or define LSOG forest conditions or display their geographical distribution. The large reserves are drawn primarily from existing roadless areas and the degree to which extant forest conditions, such as occurrence of old-growth forests, entered into their selection is not indicated in the RDEIS. Smaller reserved areas are based upon CWHR criteria, which utilize only tree size and canopy cover; selected areas are those involving higher canopy

cover. One consequence of this emphasis is a decline in occurrence of LSOG open pine and mixed-conifer forests under Alternative E (as well as all other alternatives in the RDEIS). Management to maintain LSOG forest conditions with the reserves is limited and passive. (Issues 2,3)

A credible approach to consideration of LSOG forest ecosystems in the Sierra Nevada would begin with recognition of such forests by definition and a description of the functional roles that these ecosystems play. A variety of definitions and relevant databases are available, such as old-growth definitions created by Region 5 workgroups and databases created by the Sierra Biodiversity Institute, SNEP, and the Quincy Library Group. Occurrence and condition of LSOG forests could then be considered as "affected environments" in all considered alternatives. A credible EIS alternative addressing LSOG forests would focus on maintenance of existing high quality LSOG forests and restoration of such conditions in types or regions where they are currently lacking. Areas for LSOG emphasis would be selected to provide an ecologically representative and geographically well distributed system as well as emphasizing protection of the remaining high quality LSOG forest ecosystems. Active management to protect existing high quality LSOG forests would be appropriate direction along with aggressive programs to restore fire to its appropriate role in these ecosystems. An example of an approach to LSOG maintenance and restoration, which incorporates these elements, is the Areas of Late-Successional Emphasis (ALSEs) strategy presented in SNEP.

Actions that could be taken to address these issues are clear. LSOG forest ecosystems could be defined and considered as elements of the Sierra Nevada forest landscapes. Effects of alternatives upon the occurrence and functioning of such forest ecosystems could then be evaluated. One or more alternatives directed toward maintenance and restoration of such forest ecosystems could be developed and evaluated; active, rather than passive, management to achieve such objectives needs to be incorporated into such alternatives. Spatial display of LSOG forests and reserves or areas of emphasis is possible under the above circumstances. (Issue 56)

Spatial Issues

The databases and analyses in the EIS are not designed to address the spatial elements of the Sierra Nevada ecosystems. For example, it is difficult to examine fragmentation and connectivity questions. This makes some aspects of species viability difficult to evaluate. (Issues 4,5)

The RDEIS does not adequately consider spatial relations in its assessment of the alternatives. By this we mean that the RDEIS does an inadequate job of recognizing that the spatial relation of one variable to another may be quite important in assessing the impact of management actions on either variable. The following is an example relevant to the RDEIS that illustrates the importance of considering spatial context.

The environmental significance of building a mile of road depends largely on where that road is built in relation to other features such as riparian zones or owl habitat and the amount and distribution of the existing road network. A road built 5 feet from a stream is likely to have a

greater environmental impact than one built along a ridgetop. Thus, in comparing alternatives on the basis of the amount of road built it is also important to understand whether or not the roads occur in similar types of locations within the landscape. The significance of spatial relations is not limited to environmental considerations; the impact of alternatives on jobs depends in part on the economic situation where those jobs are created or lost. For example, are the timber jobs created in areas with high unemployment and few alternatives or are they created in areas of low unemployment with a diverse economy? The concerns regarding the lack of spatial explicitness in the analyses is relevant from both an Owl and Ecosystem perspective.

In arguing that the RDEIS should consider spatial relations, it is not necessary that the RDEIS specify exactly where (e.g., spatial coordinates) an action or event will take place. That is a project level responsibility. There is, however, a difference between a plan that prescribes for all sites--clearly impossible-- and a plan in which the spatial contexts of the input or output data are retained and subsequently used for estimating effects of proposed actions, including standards and guidelines. The current analyses are limited to a single, very broad level of data and modeling and are therefore flawed with regard to spatial consideration.

Insufficient consideration of spatial relations was a common theme underlying many of the other issues. The potential underestimation of the effect of riparian buffers on PSQ, inadequate appreciation for the positive relationship between fire frequency and proximity of human settlements, and inattention to the importance of habitat connectivity for owl population viability are specific examples where neglect of this issue influences the quality of the RDEIS. The modeling analysis used to evaluate the impacts of the alternatives was done at a large scale (i.e., a national forest). Furthermore, the comparisons of the output from the modeling analysis of each of the proposed alternatives are presented in a completely aggregated form in the main text (e.g., acres of nesting habitat in all Sierra Nevada national forests). National forest-level output for some of the variables (acres by CWHR class and acres by land use classification) is presented in the appendices. Coincidence of the output variables (e.g., relationship between miles of road and acres of habitat) is not presented. The modeling documentation in the RDEIS Appendix B (pages B22-B52) discusses the use of SPECTRUM output as input to the quadrangle-scale RELM model for tactical watershed analysis (watershed scale of ~3,000 acres; 40 to 50 watersheds per ranger district). This is an appropriate scale for examining many spatial relationships. From the EIS team, the Committee received results of RELM watershed-level analyses including the spatial relationship between the land base projected for reserves under the alternatives and the location of SNEP ALSEs. However, these results or even the fact that such analyses were done are nowhere evident in the RDEIS or its appendices.

The existing RELM analysis output could be used to shed light on the spatial relations between habitat indicator variables at least at the 3,000 to 7,000 acres watershed scale. The effects of the proposed alternatives on ecosystem processes that can only be assessed at a scale finer than provided by the RELM analysis could be estimated using a sampling approach. Samples of real stands or landscapes (depending on the process to be examined) drawn from existing USFS databases, could be subjected to hypothetical management according to the proposed standards and guidelines. The processes in the resultant stand or landscape could then be modeled at the scale appropriate to the particular process—whether at the tree, stand, or landscape level. The effect of the riparian allocation on potential sale quantities could be examined this way, as could

stream sedimentation and viability of owl populations. This approach could also be used to garner insight on the likely effect of group selection on owl habitat characteristics and, subsequently, on owl habitat. Such analyses would also provide the public with a more specific depiction of the projected consequences of the proposed actions. This would be particularly true if the analyses were accompanied with an illustration of the predicted stand or landscape structural changes.

Road Issues

The miles of roads in national forests are increased under all alternatives proposed in the RDEIS. In addition to their effects on water quality sedimentation, hydrologic connectivity, aquatic and riparian habitats, roads can also lead to a direct loss and fragmentation of habitat for terrestrial vertebrates as well as influence the behavior of these animals. Recent studies in Washington, for example, suggest that owls living near roads are under higher stress than those living away from roads (Wasser et al. 1997). Roads also influence the movement of predators, competitors, brood parasites, and alien species.

Perhaps most important, the RDEIS provides no alternatives that reduce roads, nor does it fully analyze the potential effects of roads on the owl, aquatic resources, hydrologic connectivity, refugia, furbearers, and roadless areas, etc. Such analyses are difficult in the absence of spatial analysis (see Spatial Issues).

Whether the road information included in this plan was the best available or most accurate representation of information is not at all clear. For example, the Committee obtained documentation that the total road mileage estimates for the Stanislaus National Forest is 5475 miles (Clavey Wild and Scenic Rivers Values Review), whereas the RDEIS uses 2673 miles. Certainly the RDEIS is unique compared to major plans produced in the 90's in that no alternative results in a decrease of roads or decrease of impacts due to roads.

An analysis of the potential effects of road development associated with alternatives on the owl, aquatic resources, hydrologic connectivity, refugia, furbearers, roadless areas and other ecosystem values could be added. This analysis should be spatially explicit. An appropriate scale relevant to specific concerns mentioned should be chosen. This analysis should include a discussion of the cumulative impacts of roads, i.e., inclusive of existing Forest Service roads as well as roads outside Forest Service lands.

The Forest Service could also develop, after analysis and if appropriate, an alternative(s) that results in a reduction of roads or concerns related to roads.

Information on roads used in the analysis should be validated even if only random samples of the units (e.g., California Water Unit, Groveland Ranger District) are validated. A calculation of over-estimation or under-estimation of the current road miles or density is needed to fully analyze the road issues raised.

This is seen as a high priority issue for resolution. It met the criteria of 1) information available but not used and 2) possible scientifically unsupported assumptions. The significance of the issue is that its resolution may potentially result in 1) significant modification of one or more issues, and/or 2) the development of new alternatives.

Scientific Support and Consistency

Although the EIS Team engaged scientists at various stages in its work, this involvement was neither consistent across areas nor systematic in terms of evaluation and review. The role of scientists was not that of collaboration, but more in the context of reviewers. Without exception the scientists that talked to the Committee stated they never saw the complete document and were expected only to address specific questions posed by the EIS team. Discussions with Forest Service staff specialists suggest the same sort of experience and some claimed they were totally excluded from participation. Serious questions exist regarding this participation and its possible consequences in the likely event of a legal challenge.

Given the complexities of the issues, systematic and comprehensive involvement by an appropriate array of experts is especially important. The absence of such collaboration is a likely cause for the variety of difficulties in the RDEIS treatment of such issues as viability assessment, fire, old-growth forests, and aquatic habitats.

Several Forest Service models can be applied to achieve independent scientific review of the use and interpretation of scientific information in major EISs and management strategies. The Forest Service could initiate an independent review of future materials by a scientific support team; which includes experts on the biology of spotted owls, and on the array of ecosystem features and social and economic conditions likely to be influenced in any spotted owl management alternatives. If a process is developed to create an ecosystem management strategy for the Sierra Nevada, the Forest Service should consider a collaborative effort with the science community.

Chapter 4

General Issues and Concerns

Chapter 4
General Issues and Concerns

Introduction

This chapter addresses management, policy, and other issues and concerns that did not fit in with the major technical issues. It begins with a section discussing concerns related to implementation of the California Spotted Owl EIS. The chapter concludes with a section on information needs for the Sierra Nevada.

Concerns Regarding the Implementation of the California Spotted Owl EIS

The Committee fully understands that the Final EIS and accompanying Record of Decision (ROD) will be the basis for amending the Forest Plans for the 10 national forests of the Sierra Nevada. The Committee also understands that additional direction for implementation and accountability will be forthcoming from the Monitoring Program being developed for the EIS. Additional line direction from the Regional Forester will also guide ecosystem management on these forests.

During the process used by this Committee many issues and concerns were raised related to the implementation of the EIS and additional management direction related to future forest management. The Committee therefore feels it is important to convey these concerns and provide suggestions to the Forest Service that may help in addressing them. Those concerns are as follows.

There is not a formal link between the objectives of the preferred alternative and the budget and appropriation process that produces operational funding for the national forests. This problem is not unique to this EIS but creates a serious credibility problem for the agency. It is not clear in the EIS what will be accomplished at various levels of funding and the alternatives themselves were not developed within any specific budget constraints or mix of line item appropriations. The Administration could use the California Spotted Owl EIS commitments as a basis to generate adequate funding for implementation or clearly state priorities within budget constraints.

Concern was expressed about the available professional expertise for appropriate implementation of the preferred alternative. This is especially significant because the EIS is a descriptive document, and does not rely on a "cookbook" of standards and guidelines approach. The effective implementation of the preferred alternative will depend on a diverse, highly

professional workforce. The Region could review its pool of available professional expertise and develop a strategy to improve capability if appropriate.

Forest Service policies should be examined for consistency with the preferred alternative. Most likely the Region plans to do this, nevertheless, the Committee would like to document an example of a policy needing assessment prior to the implementation of the preferred alternative. One of the premises of the EIS is that harvesting of timber will reduce the potential for catastrophic fire. This reduction depends upon the level and effectiveness of slash treatment. The current fuel treatment policy only requires that within five years fuel treatment be done to achieve hazard levels equal to or less than pre-harvest hazard. Operationally, in many situations, this results in no net change in fire hazard potential.

The Region should consider changing its fuel treatment policy to require a reduction in post-harvest fire hazard potential as compared to pre-harvest conditions and to do so within one year to avoid increases in fire hazard.

Successful implementation of the preferred alternative depends upon a market for small biomass material. If current policies about minimum sizes of material offered for sale are potentially a barrier to developing new markets, they should be changed.

A long standing problem in developing an adequately funded fuel treatment program is the inability to identify the costs and expected returns in fuel management investments and adequately describe the magnitude of the required program. Additionally, it has been difficult to describe the relationship between future fire suppression costs and potential cost savings due to fuel treatment programs. The Committee also notes no proposed alternative that addresses, in a meaningful way, fire hazard reduction. The Region could develop an alternative that reduces fire hazard to be used to display to society and politicians the potential costs, and benefits of required investments. (See the Fire and Fuel section of this report.)

The successful implementation of the preferred alternative is complicated by the uncertainty of projections of outcomes and lack of scientific information. Additionally, during the timeframe for which the alternative is expected to guide forest management, new information, improved techniques, monitoring feedback, and public values will shift and change. The Committee feels it important that the Region consider implementation of adaptive management processes that help assure appropriate shifts in direction based upon these inputs. Adaptive management should include specific consideration for project design that facilitates learning from management actions.

Many persons and organizations expressed concern about the lack of a completed monitoring program. Because of the qualitative nature of the EIS, it is difficult to determine what will actually be applied to the landscape as forests attempt to achieve the vision. Unfortunately, this issue is complicated by a considerable amount of distrust in resource agencies. Substituting traditional standards and guidelines with performance measures in the monitoring plan also stimulates challenges to the professional and organizational capabilities of the Forest Service. Furthermore, NEPA processes generally do not require completion of a monitoring program prior to final decisions and issuance of the ROD. So in effect, the standards and guidelines issue

is linked to the monitoring issue. The Region should evaluate the need for additional standards and guidelines and ways in which to expand the monitoring design in the EIS. This might include the inclusion of performance measures already developed by the monitoring program design team.

The Committee detected a considerable amount of distrust in the Forest Service. There seems to be a fairly widespread belief (some of it internal) that the Agency will not actually do what it says it will do, or will go to great lengths not to implement line and administrative direction. The Committee can not assess the extent and intensity of this distrust, but hopes every step is taken to help regain employee and public confidence. Releasing the RDEIS without addressing the deficiencies identified in this report would probably exacerbate that mistrust.

One way to help increase trust would be to carefully examine how well the RDEIS states the assumptions, describes analysis techniques, and quantifies expected performance. Any constraints on the planning process should be clearly described. The criteria and techniques used to select the preferred alternative should be well documented. The content of the Record of Decision (ROD) could also help with this issue.

Information Needs for the Sierra Nevada

Several resource management questions related to the Sierra Nevada, which are lacking professional and scientific consensus, need special attention. These include:

- What is the historic structure and condition of the forest types in the Sierra Nevada?
- What is the historical pattern of fire severity in the Sierra Nevada forest types?
- How can the most appropriate silvicultural systems be designed for different biological and management contexts within each forest type?
- What fire hazard reduction alternatives should be considered and what is the projected effect of each over the short and long term?
- What are the habitat requirements of species at risk besides the spotted owl?
- What are the most appropriate modeling and databases for ecosystem assessment and management strategies in the Sierra Nevada?

The Committee suggests that additional focused research, collaborative assessments and synthesis, and analysis by Forest Service staff specialists be supported.

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A

Appendix A

Charter and Committee Members

U.S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C. 20250

DEPARTMENTAL REGULATION		NUMBER: 1043-41
SUBJECT: CALIFORNIA SPOTTED OWL FEDERAL ADVISORY COMMITTEE	DATE: March 3, 1997	
	OPI: Forest Service	

1 PURPOSE

a This charter establishes The California Spotted Owl Federal Advisory Committee. The purpose of the advisory committee is to conduct an evaluation of the proposed Revised Draft Environmental Impact Statement (RDEIS) for Managing California Spotted Owl Habitat in the Sierra Nevada National Forests of California, including supporting documents and analyses prepared in conjunction with the proposed RDEIS by:

(1) Evaluating how the proposed RDEIS integrates the information recently published in the Sierra Nevada Ecosystem Project (SNEP) Report into the management alternatives;

(2) Examining the planning models, assumptions, analytical processes, and statistical treatment of information used to develop and support management actions described in the proposed RDEIS, including the Biological Evaluation regarding the likely effects of the proposed management alternatives on species viability;

(3) Reviewing other scientific information brought to the Committee's attention which may bear on the management of the National Forest System lands as part of the Sierra Nevada ecosystem, and merits further analysis, integration or discussion by the Forest Service as part of its planning effort; and

(4) Making recommendations to the Secretary on improvements or supplements to the proposed RDEIS based on the results of (1), (2) and (3).

b The focus of the Committee will be to assure that the proposed RDEIS represents complete integration and analysis of all available significant information relevant to the management of National Forest System lands as part of the Sierra Nevada ecosystem within the context of the National Forest Management

Act, the National Environmental Policy Act, and other relevant laws. The analysis should support a reasonable range of alternatives for sustainable resource management.

2 SPECIAL INSTRUCTIONS/CANCELLATIONS

Unless renewed, this committee will terminate no later than September 30, 1997.

3 MEMBERSHIP

a The advisory committee will consist of no more than ten members and a Committee Chair appointed by the Secretary of Agriculture.

b The advisory committee shall consist of members who have pertinent scientific and analytical expertise in the California Spotted Owl, the Sierra Nevada ecosystem, and the management of the associated resources. The committee shall include expertise in silviculture, fire, ecology, aquatic ecology, fur-bearers, cumulative effects, and other skills necessary to represent all aspects of resource management.

c A vacancy on the Committee will be filled in the manner in which the original appointment was made.

d Equal opportunity practices, in line with USDA policies, will be followed in all appointments to the Committee. To ensure that the recommendations of the Committee have taken into account the needs of the diverse groups served by the Department, membership should include to the extent practicable individuals with demonstrated ability to represent minorities, women, and persons with disabilities.

e Representatives from the Forest Service team which prepared the proposed RDEIS, as well as other Forest Service resource specialists and scientists, will be made available to serve as consultants to facilitate review.

4 DUTIES

a The Committee will prepare for the information of the Chief of the

Forest Service and the Secretary or his designee, a work plan which outlines planned activities and timelines for accomplishing tasks responsive to the Purpose and Scope.

b As part of its review, the Committee shall conduct public workshops to review the findings of SNEP and RDEIS as well as other relevant information to encourage discussion of how they might be applied to management plans in the Sierra Nevada ecosystem.

c The final report will be peer reviewed and delivered by June 30, 1997, unless additional time is needed.

5 ESTIMATED ANNUAL OPERATIONS COSTS

a Members of the Committee shall serve without pay, but with reimbursement of travel expenses and per diem for attendance at the meetings approved by the leader.

b Estimated operating costs of the Committee are $250.000. Federal staff support is estimated at 1.0 staff years.

6 NUMBER AND FREQUENCY OF MEETINGS

a The advisory committee will meet as often as is necessary to complete its business.

b Majority of the members of the advisory committee shall constitute a quorum.

7 REPORTS

a Support for the advisory committee will be provided by the Forest Service.

b The advisory committee reports to the Secretary of Agriculture through the Chief of the Forest Service, and the Assistant Secretary, Natural Resources and Environment.

-END-

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Tim has served as a special consultant for the Sierra Nevada Ecosystem Project (SNEP). Author of "The Range of Light: Nature and Culture in the Sierra Nevada" and "Bioregionalism in Ecosystem Management: Values, Ethics, and the Public Trust" (both to be published by University of California Press in 1998, and 1999 respectively).

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Ph.D. Forest Ecology, Oregon State University, OR; B.A. in Biology, Dartmouth College, Hanover, NH

Robin is a research scientist and leader of the Systems Integration task of the Biomass Feedstock Development Program within the Environmental Sciences Division of the Oak Ridge National Laboratory (ORNL). Prior to joining ORNL in 1986, she worked for the R&D division of Weyerhaeuser Company in the Pacific Northwest. Her current research focus is regional-scale integrated assessment of natural resources.

Dr. Ralph J. Gutièrrez

Professor of Wildlife, Humboldt State University, Arcata, CA

Ph.D. Zoology, University of California, Berkeley, CA; M.S. Biology, University of New Mexico, Albuquerque, NM; B.S. Wildlife Biology, Colorado State University, Fort Collins, CO.

Ralph is a Professor of Wildlife for Department of Wildlife at Humboldt State University in Arcata, CA. He has served on the Northern Spotted Owl Recovery Team, and on the California Spotted Owl Technical Assessment Team (CASPO).

Dr. Charles W. Philpot

Retired Station Director, US Forest Service Pacific Northwest Research Station, Portland, OR

Ph.D. Plant Chemistry, University of Montana, Missoula, MT; M.S. Forest Science, University of California, Berkeley, CA; B.S. Forest Management, University of California, Berkeley, CA

Charles did research in California and throughout the west on fire effects and chemistry. He has led national task forces on public resource policy and is a recognized expert on science-policy relationships.

Dr. Norman H. Pillsbury

Department Head and Professor of Forestry of the Natural Resources Department at California Polytechnic State University, San Luis Obispo, CA

Ph.D. Earth Resources, Colorado State University, Fort Collins, CO; M.S. Watershed Management, Humboldt State University, Arcata, CA; B.S. Forest Management, Humboldt State University, Arcata, CA

Norman is a California Registered Professional Forester with 20 years of research and teaching in specialty fields of forest mensuration, growth and yield, computer operations, study design and statistical analysis, remote sensing, and watershed management and protection. His research has been conducted in nearly all forest and woodland vegetation types in California.

Dr. Albert Stage

Retired Research Scientist, Moscow, ID

Ph.D. Forest Mensuration, University of Michigan Ann Arbor, MI; M.S. Forestry, University of Michigan; Ann Arbor, MI; B.S. Forestry, University of Michigan, Ann Arbor, MI

Albert retired from the Forest Science Laboratory in Moscow, ID. His 44 years of research service has included problems in forest biometry and land use planning. He is affiliated with the Columbia River Basin Assessment team, PROGNOSIS forest growth and development model, the Society of American Foresters (SAF), and the SAF biometrics working group.

Dr. Jan W. van Wagtendonk

Research Scientist, US Geological Survey, El Portal, CA

Ph.D. Wildland Resource Science/Fire Ecology, University of California, Berkeley, CA; M.S. Range Management, University of California at Berkeley, CA; B.S. Forest Management, Oregon State University, Corvallis, OR

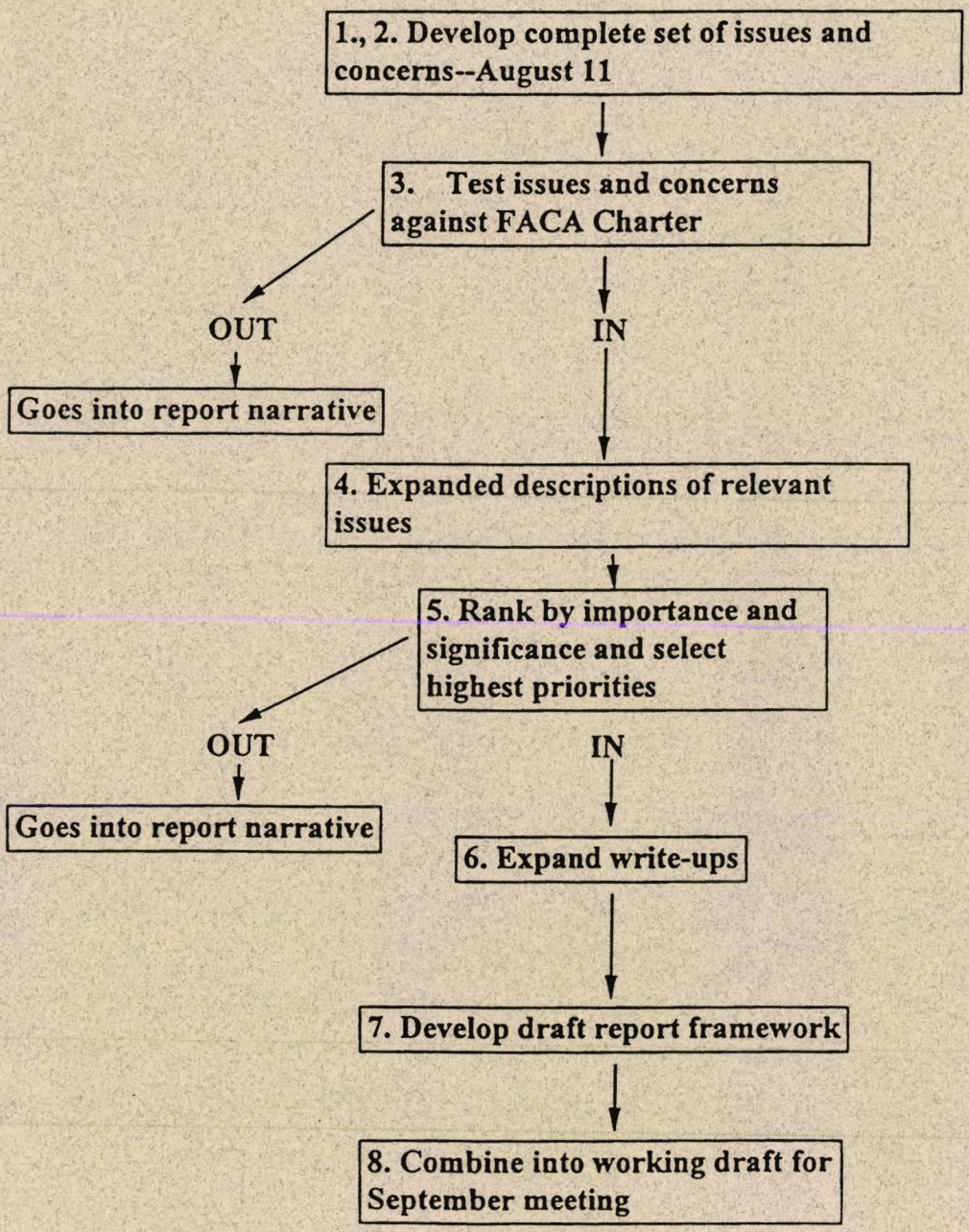
Jan is a research scientist at the Yosemite Field Station in El Portal, CA. His research includes prescriptions for burning in wildland ecosystems, recreation impacts in wilderness, and application of geographic information systems to resource management. His primary research focus is on the role of fire in Sierra Nevada ecosystems.

B

Appendix B

Report Development Process

Report Development Process


1., 2. Develop complete set of issues and concerns--August 11
3. Test issues and concerns against FACA Charter
OUT
IN
Goes into report narrative
4. Expanded descriptions of relevant issues
5. Rank by importance and significance and select highest priorities
OUT
IN
Goes into report narrative
6. Expand write-ups
7. Develop draft report framework
8. Combine into working draft for September meeting

California Spotted Owl Federal Advisory Committee Report Development Process

Step	Who	When Due
1. Committee members send additional issues and concerns to Chair.	Committee members	Monday, August 11
2. Develop complete list of issues and concerns. Aggregate and simplify.	Chair	Tuesday, August 12
3. Determine if issues or concerns are within committee charter. (Save those outside charter for inclusion in report narrative.)	Committee (individual phone conversations with Chair)	August 14
4. Expand issues and concerns description. (Just adequate enough for step 5.)	Chair	Monday, August 18
5. Rank issues and concerns by importance and significance using committee evaluation criteria. Select highest ranked issues for further analyses and definition. (Save lower priorities for report narrative.)	Committee (individual phone conversations with Chair)	Wednesday, August 20
6. Expand write-ups of high priority issues and concerns. (one-pagers)	Subcommittee Leaders	September 2
7. Develop draft report framework including history of issue, committee process, committee participants, presenters at meetings, alternative recommendations.	Chair	September 2
8. Combine draft report with issues write-ups and concerns into a working draft for September meeting. Provide to committee members.	Chair	September 2
9. Meet on September 11,12, 13 in "workshop" format. Agree on content of committee review draft.	Committee	September 11, 12, 13 (Thursday, Friday, Saturday)

CALIFORNIA SPOTTED OWL FEDERAL ADVISORY COMMITTEE
P.O. Box 3890
Portland, OR 97208-3890
Phone: 503/808-2113 Fax: 503/808-2130

Issues and Concerns identified from CSOFAC Activities and Processes

This list is presented as originally stated and prior to refinement or elimination.

1. Monitoring plan not complete.
2. No explicit LSOG alternative.
3. Remaining LSOG not protected or expanded.
4. Plan is not spatially explicit.
5. Databases are not spatial.
6. Modeling assumptions, methodologies not well described.
7. Fuel reduction inadequate.
8. Fuels management (slash disposal) policy inappropriate.
9. Little impact on short-term fire hazard.
10. Does Forest Service have the ability & capability to implement?
11. Viability analyses incomplete, inadequate, or lacking in scientific credibility. (Spatial issues of fragmentation, distribution of large trees, cascading effects of decisions on viability analysis.)
12. Effects of roads and new roads. (Habitat and aquatic/riparian)
13. Conflicts over the extent of five effects on habitat.
14. Inadequate standard and guides.
15. EIS is not a conservation strategy.
16. All alternatives include additional roads.
17. Process is taking too long.
18. There is no Quincy Library Group alternative.
19. Inclusion misrepresents proposal.
20. Appendix Q is inadequate or inappropriate way to address SNEP.
21. Plan does not address uncertainty.
22. EIS does not address many forest species.
23. EIS assumptions not adequately presented.
24. Aquatic/riparian strategy not adequate.
25. EIS link with action on ground not clear.
26. Discrepancy between criteria used in BE/BA and criteria used to select preferred alternative or compare alternatives.
27. Little or no difference among alternatives on fire occurrence and effects.
28. "Chapel," et al. alternative not explored.
29. No link between EIS preferred alternative and budget process. Not clear what gets implemented if funds are inadequate.
30. Forest Service implementation record is not good.
31. Definition of no-action alternative is inappropriate.
32. There are no alternatives that will pass legal challenge. (Single species vs. conservation strategy.)

33. Social/economic indicators inadequate to assess impacts.
34. Methodology describing relationship between group selection and fire hazard.
35. The implications of the "Lake Tahoe Gap" not considered.
36. No definition of, or direction to implement adaptive management.
37. EIS was developed with inadequate collaboration with representatives of science community.
38. Science review not done.
39. Impact of preferred alternative on community viability.
40. Use of stand resilience index is unreliable.
41. Fuel measurements inadequate.
42. Economic feasibility of biomass utilization not well addressed.
43. ERA methodologies inadequate.
44. Impacts of proposed buffers on commodities understated.
45. Treatment activities allowed in riparian zones inappropriate or not consistent with SNEP.
46. Preferred alternative projects decline of species (i.e., fur bearers).
47. Guidance for watershed analysis is vague. No ecological performance standards.
48. Harvest projections too high because of the way aquatic/riparian protection areas were mapped and analyzed.
49. Preferred alternative has highest impact on soils due to road and silviculture.
50. Dependency of preferred alternative on small material market is unfounded.
51. Cumulative effects analysis and consideration is inadequate.
52. LSOG definitions different in EIS and SNEP. EIS emphasizes size, not structure and age.
53. Forty percent tree removal allowed with EA--not sure what this means.
54. Alternative E is not LSOG alternative because it does not display spatial ???
55. EIS does not adequately address the role of LSOG as part of the overall forest mosaic.
56. LSOG can not be displayed spatially.
57. LSOG is not considered as a resource, but a condition described by tree size and structure.
58. Herbicide use.
59. Adjacent lands (cumulative effects, fire etc.).
60. Insect and disease processes not considered.
61. Stand resiliency index untested.
62. Not clear how alternatives were actually evaluated.
63. Protection of spotted owl insufficient.
64. Long-term projections for large trees indefensible.
65. Silvicultural systems don't match models.
66. No guidance for aquatic restoration.
67. Private lands not involved in cumulative effects assessments.
68. Some criteria in BE/BA were not used in final decision process (selection of alternative).
69. Road database used in EIS is out of date and understates road density.

CALIFORNIA SPOTTED OWL FEDERAL ADVISORY COMMITTEE

P.O. Box 3890
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Phone: 503/808-2113 Fax: 503/808-2130

MEMORANDUM

DATE: *July 18, 1997*

TO: *Committee Members*

FROM: *Charles Philpot, Committee Chair*

SUBJECT: *Proposed Criteria for Evaluating the Significance of Issues for Inclusion in the Draft Committee Report*

The California Spotted Owl Federal Advisory Committee (CSOFAC) has been asked to evaluate the adequacy of a proposed review draft EIS. This draft resulted from revision of the first review draft based on consideration of about 4,000 review responses plus information contained in the Sierra Nevada Ecosystem Project report. The main concern of the Secretary is whether the proposed review draft is comprehensive enough, based on currently available technical alternatives and their related impacts and outcomes. Therefore, the Committee needs to be very careful in how it selects and addresses its issues. We must deal only with highly significant concerns and not details that can be addressed in the normal EIS review process.

Therefore, a CSOFAC "issue" should be described as one or more of the following:

1. Information available, but not used
2. Scientifically unsupported assumptions
3. Misinterpretation of information
4. Misuse of information
5. Inappropriate model or data base related to questions being addressed or projection being made
6. Inappropriate processes used to gather relevant information

And solving the "issue" leads to one or more of the following results:

1. Significant modification of one or more alternatives
2. Development of additional alternatives
3. Significantly changes the projected impacts
4. Changes the alternative selected
5. Changes the management direction designed to implement preferred alternative

These two sets of criteria will guide the Committee during the next two meetings when sub-committee reports are considered. They will also be used in selecting issues for our draft report.

cc:
J.Stephens
K.Clement

(criteria:cap/cls)

Issues Matrix—Table 1 shows 1-4

Note: This table replicates the table used as a working process document at the third meeting of the Cal Owl Committee. It is not conclusive. All committee members may not agree with assessments and narratives.

Review Process→ **Issue ↓**	**#1-Description of the issue**	**#2- Is it real or perceived?**	**#3 Recommended priority (L,M, H)**	**#4 Which of six potential criteria did it meet?**
1.Analysis Technique				
23	----	Real	Med.	1
11, 22	----	Real	High	1,2,3,4,5,6
40, 13	Standard resilience silviculture systems don't match the models.	Real	Med./High	2
65	----	Perceived	----	----
67,59	Private, adjacent	Real	Cum eff.—H Commun. eff—L Fire—M For/ Prac. On Priv. Lands/GAP—M	1
General Comments	Lack of specificity, lack of resolution	----	----	----
2.Modeling Assumptions				
53,60,64	Large tree reliability—mortality rate	Real	H—critical to owl biology	5(. Not avail when anal. Was done).
6	—	Real	High	—
3. Range of Alternatives				
18,19	If talk about it, be clear what it is.	----	----	----
31	Case law—is A even a viable alternative?	Real	High	3
28	Chapel et.al.—biodiversity	Real	High	3
4. Standards and Guidelines				
14	Adequacy of S&Gs to do what we say they will do. How well does modeling address S&Gs.	----	----	----
66,47	----	Perceived	----	----
24	Redefine EIS/Monitoring/Adaptive Management, not S&Gs	Perceived	----	----
5. Viability Assessment				
11,21,22, 35,46	Change in focus of planning from biomass to Information Decision Analysis framework.	Real	Recognition—H Process Mod—H	1
6. Fuels and Fire				
7,8,9,27, 34,41	Are we using the right measures for fire issue?	Real	High	1,2,3
7. LSOG				
2,3,54,56,52,55	Does RDEIS provide a credible 0-6 alternative? Does Alt. E represent a credible effort?	Real	High	1
8. Alternative Evaluation				
62,68,26,33,29,49	Concerned about the collapse of information to summarize—loss of resolution—judgments enter into the process that aren't evident to decision-maker. 2. Explicit consideration of uncertainty. 3. Translation of indicators into summary info—don't lose key indicators. Potential effects of soil productivity, erosion, & siltation.	Real	High	1,5,7
9. Spatial Issues, Considerations, and Integrity				
4,5,63,44,48,34	Ability to analyze things with some reference to where things are no the ground. Highlight this as a cross-cutting issue. Protection of owl is insufficient	Real	High	1,2,3

Table 1 cont.

10. Monitoring Plan				
1	Monitoring has taken on importance. Is the framework adequate for the EIS? Where is accountability? How will agency decide what the monitoring program will be? How does information generated by monitoring feed back to management? To adaptive management?	Real	M-H	----
11. Roads				
12,16,69	Add owl info. Add hydrologic connectivity. Fragmentation, stress, loss of habitat. Concerned road DB might not be correct.	Real	High	1, maybe 2
12. Science Support				
37,38	• Weak point w/EISs—legal challenges. • Scientists were involved & did collaborate.	Real	High	1,2,3,4,5,6
20,45	Is App Q an inadequate way to address SNEP? Is there science available? Is it significant?	----	----	----

Issues Matrix—Table 2 shows 5-8+Narrative

Note: This table replicates the table used as a working process document at the third meeting of the Cal Owl Committee. It is not conclusive. All committee members may not agree with assessments and narratives.

Review Process→ **Issue** ↓	**#5 What is the potential significance?**	**#6 Which context does it apply to?**	**#7 Discussion and comments**	**#8 Is the issue retained?**	**Narrative**
1.Analysis Technique					
23	3,4,5	Both	Clarify	Yes	----
11, 22	1,2,3,4,5	Owl	----	Yes	Via anal—subj. mis-interpretation owl viab. data. What variables cause + or – in suitable habitat?
40	3, maybe 4	Both	Need science to back up experience.	Yes	No documentation for index threshold used—index untested. Talk about ways to get trends going in the right way—besides the EIS (very significant issue).
65	----	----	Assumptions used vs. modeling method	----	OK because correct science background mortality used.
67,59	Fire 3,1, Social values 4	Both	Modeling system—state-of-the-art to the extent that space and priv. lands matter.	Cum. Eff+ Fire—yes Soc.--No	Fire, settlement, GAPS, at risk communities.
General	----	----	----	----	Timber proj., owl data, don't cross Discontinuities with use of arbitrary cut-offs
2.Modeling Assumptions					
53, 60, 64	Has to do w/uncertainty 6	----	----	----	----
6	6	----	Document assumptions so public can understand	Yes	----
3. Range of Alternatives					
18,19	----	----	Narrative	No	----
31	4,5	Owl	Could change selected alternative.	Yes	"No Action" could get to what is difference between D&G.
28	1	Both	It is prudent to consider other species.	Yes	----
4. Standards and Guidelines					
14	6	----	Some of the S&Gs are more tactical vs. strategic which is EIS level.	----	----
66, 47	----	----	Narrative	No	----
24	----	----	Strategy adequate—not complete w/o monitoring plan+adap.mgmt. Narrative.	No	----
5. Viability Assessment					
11,21,22, 35,46	1-6	Both	Some other tools avail. like risk analysis+decision analysis . Policy changes would be another "uncertainty."	Yes	----

Table 2 cont.

6. Fuels and Fire					
7,8,9,27, 34,41	1,2,4,6	Both	Wildfire acres↑; Prescribed fire acres↓; treatment↑; maintenance→must treat harvest acres, fuel breaks, & matrix	Yes	----
7. LSOG					
2,3,54,56,52,55	2,3,4	Ecosystem	Alt. E no use of 0-6 definition or criteria—uses 5 classes of trees. Doesn't provide for any active management.	Yes	Used CA Wildlife habitat database. Does not address 0-6 as an ecosystem.
8. Alternative Evaluation					
62,68,26,33,29,49	1-6	Both	*Trend information relative to other infor. *Relative to current condition.	Yes.	Update the socio-economic indicators. Socio-economic indicators need to address other aspects of empl/income indicators *EIS key comparisons chart-20 criteria allow a trade-off analysis. *This summarizes key criteria.
9. Spatial Issues, Considerations, and Integrity					
4,5,63,44,48,34	1,2,3	Both	This issue is likely a part of every issue--spatial relationship of one thing to another.	Yes	Viability assess. needs spatial reference. This is a recurring theme.
10. Monitoring Plan					
1	6	Both	Tim's figure. Prescription+Monitoring specificity prepare the reader for uncertainty generated by monitoring plan. Not problem with EIS, concerned about implementability aspect. Monitor the attributes that trigger changes in decision process&predictions.	Yes	• Process outlined between now and program development. • Suggest owl monitoring move to habitat monitoring. • Accountability is in monitoring rather than S&G/EIS. • Suggest add scientists to developing. Monitoring plan. • Don't react too quickly to monitoring data. • Another aspect would monitor for new elements.
11. Roads					
12,16,69	Database 1,2 Maybe 5	Both	Can lead to habitat loss directly. Roads can lead to ↑ stress on owls. Roads are one aspect of fragmentation.	Yes	Define significant. If total is more, the percent increase could be less. Maybe don't use term significant.
12. Science Support					
37,38	1,2,3,4,5,6	Both	Scientists on EIS team. Scientific support team. Pre-EIS scientific assess. done. No science consistency analysis or scientific peer review done.	Yes	• Need scientific collaboration. • Dealt with differently with each context.
20,45	----	----	Not stand alone issues.	No	----

Appendix C

Peer Review Process

Formal Review Process

The charter directed the Committee to have its product peer reviewed. Since the Committee report is not a scientific document the traditional peer review is not appropriate. The Committee agreed to have the Vice Chair arrange for five experts to review the report in terms of clarity, logic, and how well the terms of the charter were met. The names of the reviewers and the letter sent to them follows.

Dr. Kai Lee
Center for Environmental Studies, Williams College

Dr. David Parsons
Leopold Institute

Dr. Dean Urban
Nicholas School of the Environment, Duke University

Dr. Margaret Shannon
Department of Sociology, Syracuse University

Dr. Don Erman
University of California, Davis

Figure A-1 "Formal" review letter transmitting the draft report. (Contacted in advance by telephone.)

Dear _____:

Thank you for agreeing to serve as an external reviewer for the enclosed draft report of the California Spotted Owl Federal Advisory Committee. I have enclosed a copy of Secretary Glickman's charge to the Advisory Committee.

The Advisory Committee's report is based on a detailed evaluation of the Revised Draft Environmental Impact Statement for Managing California Spotted Owl Habitat, the Sierra Nevada Ecosystem Project reports, and written input and testimony from a variety of individuals and organization, including the EIS team.

Although comments on substantive issues raised in the report are welcome, we recognize that a thorough review of such details would be impossible without access to all these materials. In that light, we are most interested in your evaluation of the clarity, logic, and overall organization of the report. In particular,

- Does the report respond completely and directly to Secretary Glickman's charge?
- Do portions of the report appear to be irrelevant to or outside that charge?
- Is the report organized in a clear and cogent fashion?
- Will decisionmakers and key stakeholders understand it?
- Are its findings and recommendation clearly stated and appropriately supported?

Importantly, your review comments will be used only to improve the clarity and presentation of the report. Your comments will not be used to imply support or lack thereof for the report findings or recommendations.

It is critical that the Advisory Committee receive your comments no later than Friday, November 21. You may fax them to me at 919-684-8741 or E-mail them to normc@duke.edu. However, please also send a signed hard copy to my office by mail. In accordance with the Federal Advisory Committee Act, your review will become part of the record for this process, and thus available to the public under the Freedom of Information Act.

Again, thank you for your help on this important project.

Sincerely,

NLC

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